MBA Guide to Dental Practice Management

CREATING AND MANAGING A SUCCESSFUL DENTAL PRACTICE

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PRACTICE MANAGEMENT

This book was written during and after my tenure at Dalhousie University while completing the Regular Stream Master's of Business Administration Degree (MBA), with a focus on finance and health care management. The big picture purpose of this book is to provide flexibility and practicality to meet the business needs of the dental/medical community. The program is a simple way for dentists/doctors to acquire the business savvy they need to enhance their profits via efficient management of their practices and finances. This knowledge has been tremendously useful to me in my practices and personal life.

Beyond being an artifact as a book, The MBA Guide to Dental Practice Management is also intended on being a series of lectures which are a based upon real courses taken during an MBA Program and how they specifically relate to the business operations of a dental practice. The course is not intended to be an actual MBA degree but to be an eye opener in specific areas in which participants can further their own self-study into the sub-topics of organizational behaviour, management information systems, advertising management, financial and managerial accounting, key performance indicators, economics, operations management, project management, marketing and strategic thinking. Case studies and presentations are critical to developing the type of strategic thinking required to head an organization, and this is not easy to achieve in a book but requires valuable time in class with others and getting feedback.

The end goal of the course is to be able to empower the participant to have the tools necessary to create and sustain, through proper management and leadership, a successful dental practice.

A DEFINITION OF ENTREPRENEURSHIP

The concept of entrepreneurship has a wide range of meanings. On the one extreme an entrepreneur is a person of very high aptitude who pioneers change, possessing characteristics found in only a very small fraction of the population. On the other extreme of definitions, anyone who wants to work for himself or herself is considered to be an entrepreneur.

The word entrepreneur originates from the French word, entreprendre, which means "to undertake." In a business context, it means to start a business. The Merriam-Webster Dictionary presents the definition of an entrepreneur as one who organizes, manages, and assumes the risks of a business or enterprise.

Schumpeter's View of Entrepreneurship

Austrian economist Joseph Schumpeter 's definition of entrepreneurship placed an emphasis on innovation, such as:

- new products
- new production methods
- new markets
- new forms of organization

Wealth is created when such innovation results in new demand. From this viewpoint, one can define the function of the entrepreneur as one of combining various input factors in an innovative manner to generate value to the customer with the hope that this value will exceed the cost of the input factors, thus generating superior returns that result in the creation of wealth.

Entrepreneurship vs. Small Business

Many people use the terms "entrepreneur" and "small business owner" synonymously. While they may have much in common, there are significant differences between the entrepreneurial venture and the small business. Entrepreneurial ventures differ from small businesses in these ways:

1. Amount of wealth creation - rather than simply generating an income stream that replaces traditional employment, a successful entrepreneurial venture creates substantial wealth, typically in excess of several million dollars of profit.
2. Speed of wealth creation - while a successful small business can generate several million dollars of profit over a lifetime, entrepreneurial wealth creation often is rapid; for example, within 5 years.
3. Risk - the risk of an entrepreneurial venture must be high; otherwise, with the incentive of sure profits many entrepreneurs would be pursuing the idea and the opportunity no longer would exist.
4. Innovation - entrepreneurship often involves substantial innovation beyond what a small business might exhibit. This innovation gives the venture the competitive advantage that results in wealth creation. The innovation may be in the product or service itself, or in the business processes used to deliver it.

ORGANIZATIONAL BEHAVIOUR:

MANAGING PEOPLE

The effective management of people in an organization requires an understanding of motivation, job design, reward systems, and group influence.

Behavior Modification

Operant conditioning is the learning that takes place when the learner recognizes the connection between a behavior and its consequences.

Positive reinforcement vs. punishment: rewarding desired behavior vs. punishing undesired behavior.

Negative reinforcement: removing negative consequences from workers who perform the desired behavior.

Extinction: removing whatever is currently reinforcing the undesirable behavior.

Reinforcement schedules: variable, erratic reinforcement schemes are more effective than steady reinforcement schedules.

Classical conditioning: if one gets sick after eating tacos, from that point forward one may get sick from the smell of tacos. People are genetically hard-wired to make certain associations. For example, sickness is associated with food.

Expectancy Theory

The expectancy theory of motivation models motivational force as the product of three factors perceived by the individual. There is research evidence to support the theory, and it has become relatively widely accepted.

Principal-Agent Problem

In a company, stockholders are principals and managers are agents. The goal of a compensation system is to align principals' and agents' interests.

Executives who are compensated based on financial performance may favor diversifying the company since it evens out their incomes. But shareholders can diversify their portfolios on their own if they want.

Promotion Tournaments

The purpose of high executive salaries is to motivate those at lower levels by giving them a goal or prize for which to strive. If eight people are competing for a position, only one of them has to be paid the big prize, but they all are motivated.

Job Design

Scientific management took all authority away from the workers – no thinking was needed. Skill variety, task identity, task significance, autonomy, and feedback all were missing.

Giving people choices provides more job satisfaction. One way of doing this is to propose an alternative or two that is inferior, and ask for the employee's opinion. An exaggerated example that illustrates this point: in selecting the foundation of a building, the manager, knowing concrete is better, can propose wood. The employee proposes concrete and gains satisfaction from "convincing" the manager of the right decision.

Equity Theory

People care about fairness and are willing to give up money to avoid unfair treatment.

An example of this idea is a game in which one person is handed 100 dollars, and this person must propose to give part of the money to a second person. The first person must propose the amount that he or she will give to the second person, and the second person can accept or reject the offer. If the second person accepts the offer, then it stands as proposed. If the second person rejects the offer, neither of the two people get to keep any of the money. Assuming that the two people never will deal with each other again, the rational decision of the second person is to accept any amount that the first person offers. However, if the first person offers only one dollar, the second person may refuse this low offer simply to punish the first person who is not offering a "fair" split.

Reward Systems

Employees like performance rating distributions in which almost everyone is at the top, but in which a few really get punished. Employees hate systems in which only a few get top ratings.

When people are given higher rewards than what they deserve, at first their performance improves, but then they start reasoning that they really are worthy and begin to slack off.

Efficiency Wages

For lower-level workers, performance increases with increased wages. Efficiency wages are wages set at a higher-than-market clearing wage, set by employers to:

- discourage shirking by raising the cost of being fired
- encourage worker loyalty
- raise group output norms
- improve the applicant pool
- raise morale

Rationalizing Behavior

Cognitive dissonance is the state of conflict that one faces when one's attitudes are contradicted by the situation that one is experiencing. In this situation, people often rationalize anything that is inconsistent in their minds. For example, one may come to love the things for which he or she is poorly compensated in order to resolve the inconsistency of doing something that one does not want to do for below average pay.

Characteristics of Jobs and Work that Substitute for Formal Leadership

In flat organizations, there are fewer opportunities to formally manage the work of others. In this situation, people may become de-motivated because they feel that they are not advancing. However, some environments have characteristics that can substitute for more formal leadership opportunities. These characteristics are:

Professional orientation
Performance feedback provided by work itself
Cohesive, interdependent work groups and advisory panel
Written goals and rigid procedures

Groupthink

Concurrence-seeking may become so dominant in a group that it overrides objective appraisal. In a cohesive group, individuals truly may believe that a bad proposal is a good one without scrutinizing it.

Managing Individual and Group Performance

When one person excels, the others do not look as good. Furthermore, good performance is often "rewarded" with increased quotas.

- What motivates people:
    - patients, staff, yourself
    - Theories
        - Maslow
        - ERG
        - Hertzberg Two factor, Motivator Hygiene

Expectancy Theory

The expectancy theory of motivation has become a commonly accepted theory for explaining how individuals make decisions regarding various behavioral alternatives. Expectancy theory offers the following propositions:

When deciding among behavioral options, individuals select the option with the greatest motivation forces (MF).

The motivational force for a behavior, action, or task is a function of three distinct perceptions: Expectancy, Instrumentality, and Valance. The motivational force is the product of the three perceptions:

MF = Expectancy x Instrumentality x Valence

Expectancy probability: based on the perceived effort-performance relationship. It is the expectancy that one's effort will lead to the desired performance and is based on past experience, self-confidence, and the perceived difficulty of the performance goal. Example: If I work harder than everyone else in the plant will I produce more?

Instrumentality probability: based on the perceived performance-reward relationship. The instrumentality is the belief that if one does meet performance expectations, he or she will receive a greater reward. Example: If I produce more than anyone else in the plant, will I get a bigger raise or a faster promotion?

Valence: refers to the value the individual personally places on the rewards. This is a function of his or her needs, goals, and values. Example: Do I want a bigger raise? Is it worth the extra effort? Do I want a promotion?

Because the motivational force is the product of the three perceptions, if any one of their values is zero, the whole equation becomes zero.

Expectancy theory generally is supported by empirical evidence and is one of the more widely accepted theories of motivation.

- How to manage people
    - Vroom Path Goal
    - Management by Objectives
    - Goal Setting

Performance Appraisal

- periodic, goal oriented, motivate you staff, rewards

Personality Types & Testing

- NAch
- NSoc
- Path

THE 7 HABITS OF HIGHLY EFFECTIVE PEOPLE

Summary of Stephen R. Covey's

In his #1 bestseller, Stephen R. Covey presented a framework for personal effectiveness. The following is a summary of the first part of his book, concluding with a list of the seven habits.

Inside-Out: The Change Starts from Within

While working on his doctorate in the 1970's, Stephen R. Covey reviewed 200 years of literature on success. He noticed that since the 1920's, success writings have focused on solutions to specific problems. In some cases such tactical advice may have been effective, but only for immediate issues and not for the long-term, underlying ones. The success literature of the last half of the 20th century largely attributed success to personality traits, skills, techniques, maintaining a positive attitude, etc. This philosophy can be referred to as the Personality Ethic.

However, during the 150 years or so that preceded that period, the literature on success was more character oriented. It emphasized the deeper principles and foundations of success. This philosophy is known as the Character Ethic, under which success is attributed more to underlying characteristics such as integrity, courage, justice, patience, etc.

The elements of the Character Ethic are primary traits while those of the Personality Ethic are secondary. While secondary traits may help one to play the game to succeed in some specific circumstances, for long-term success both are necessary. One's character is what is most visible in long-term relationships. Ralph Waldo Emerson once said, "What you are shouts so loudly in my ears I cannot hear what you say."

To illustrate the difference between primary and secondary traits, Covey offers the following example. Suppose you are in Chicago and are using a map to find a particular destination in the city. You may have excellent secondary skills in map reading and navigation, but will never find your destination if you are using a map of Detroit. In this example, getting the right map is a necessary primary element before your secondary skills can be used effectively.

The problem with relying on the Personality Ethic is that unless the basic underlying paradigms are right, simply changing outward behavior is not effective. We see the world based on our perspective, which can have a dramatic impact on the way we perceive things. For example, many experiments have been conducted in which two groups of people are shown two different drawings. One group is shown, for instance, a drawing of a young, beautiful woman and the other group is shown a drawing of an old, frail woman. After the initial exposure to the pictures, both groups are shown one picture of a more abstract drawing. This drawing actually contains the elements of both the young and the

old woman. Almost invariably, everybody in the group that was first shown the young woman sees a young woman in the abstract drawing, and those who were shown the old woman see an old woman. Each group was convinced that it had objectively evaluated the drawing. The point is that we see things not as they are, but as we are conditioned to see them. Once we understand the importance of our past conditioning, we can experience a paradigm shift in the way we see things. To make large changes in our lives, we must work on the basic paradigms through which we see the world.

The Character Ethic assumes that there are some absolute principles that exist in all human beings. Some examples of such principles are fairness, honesty, integrity, human dignity, quality, potential, and growth. Principles contrast with practices in that practices are for specific situations whereas principles have universal application.

The Seven Habits of Highly Effective People presents an "inside-out" approach to effectiveness that is centered on principles and character. Inside-out means that the change starts within oneself. For many people, this approach represents a paradigm shift away from the Personality Ethic and toward the Character Ethic.

The Seven Habits - An Overview

Our character is a collection of our habits, and habits have a powerful role in our lives. Habits consist of knowledge, skill, and desire. Knowledge allows us to know what to do, skill gives us the ability to know how to do it, and desire is the motivation to do it.

The Seven Habits move us through the following stages:

Dependence: the paradigm under which we are born, relying upon others to take care of us.

Independence: the paradigm under which we can make our own decisions and take care of ourselves.

Interdependence: the paradigm under which we cooperate to achieve something that cannot be achieved independently.

Much of the success literature today tends to value independence, encouraging people to become liberated and do their own thing. The reality is that we are interdependent, and the independent model is not optimal for use in an interdependent environment that requires leaders and team players.

To make the choice to become interdependent, one first must be independent, since dependent people have not yet developed the character for interdependence. Therefore, the first three habits focus on self-mastery, that is, achieving the private victories required to move from dependence to independence. The first three habits are:

Habit 1: Be Proactive
Habit 2: Begin with the End in Mind
Habit 3: Put First Things First
Habits 4, 5, and 6 then address interdependence:
Habit 4: Think Win/Win
Habit 5: Seek First to Understand, Then to Be Understood
Habit 6: Synergize

Finally, the seventh habit is one of renewal and continual improvement, that is, of building one's personal production capability. To be effective, one must find the proper balance between actually producing and improving one's capability to produce. Covey illustrates this point with the fable of the goose and the golden egg.

In the fable, a poor farmer's goose began laying a solid gold egg every day, and the farmer soon became rich. He also became greedy and figured that the goose must have many golden eggs within her. In order to obtain all of the eggs immediately, he killed the goose. Upon cutting it open he discovered that it was not full of golden eggs. The lesson is that if one attempts to maximize immediate production with no regard to the production capability, the capability will be lost. Effectiveness is a function of both production and the capacity to produce.

The need for balance between production and production capability applies to physical, financial, and human assets. For example, in an organization the person in charge of a particular machine may increase the machine's immediate production by postponing scheduled maintenance. As a result of the increased output, this person may be rewarded with a promotion. However, the increased immediate output comes at the expense of future production since more maintenance will have to be performed on the machine later. The person who inherits the mess may even be blamed for the inevitable downtime and high maintenance expense.

Customer loyalty also is an asset to which the production and production capability balance applies. A restaurant may have a reputation for serving great food, but the owner may decide to cut costs and lower the quality of the food. Immediately, profits will soar, but soon the restaurant's reputation will be tarnished, the customer's trust will be lost, and profits will decline.

This does not mean that only production capacity is important. If one builds capacity but never uses it, there will be no production. There is a balance between building production capacity and actually producing. Finding the right tradeoff is central to one's effectiveness.

The above has been an introduction and overview of the 7 Habits. The following introduces the first habit in Covey's framework.

FROM DEPENDENCE TO INDEPENDENCE

Habit 1: Be Proactive

A unique ability that sets humans apart from animals is self-awareness and the ability to choose how we respond to any stimulus. While conditioning can have a strong impact on our lives, we are not determined by it. There are three widely accepted theories of determinism: genetic, psychic, and environmental. Genetic determinism says that our nature is coded into our DNA, and that our personality traits are inherited from our grandparents. Psychic determinism says that our upbringing determines our personal tendencies, and that emotional pain that we felt at a young age is remembered and affects the way we behave today. Environmental determinism states that factors in our present environment are responsible for our situation, such as relatives, the national economy, etc. These theories of determinism each assume a model in which the stimulus determines the response.

Viktor Frankl was a Jewish psychiatrist who survived the death camps of Nazi Germany. While in the death camps, Frankl realized that he alone had the power to determine his response to the horror of the situation. He exercised the only freedom he had in that environment by envisioning himself teaching students after his release. He became an inspiration for others around him. He realized that in the middle of the stimulus-response model, humans have the freedom to choose.

Animals do not have this independent will. They respond to a stimulus like a computer responds to its program. They are not aware of their programming and do not have the ability to change it. The model of determinism was developed based on experiments with animals and neurotic people. Such a model neglects our ability to choose how we will respond to stimuli.

We can choose to be reactive to our environment. For example, if the weather is good, we will be happy. If the weather is bad, we will be unhappy. If people treat us well, we will feel well; if they don't, we will feel bad and become defensive. We also can choose to be proactive and not let our situation determine how we will feel. Reactive behavior can be a self-fulfilling prophecy. By accepting that there is nothing we can do about our situation, we in fact become passive and do nothing.

The first habit of highly effective people is proactivity. Proactive people are driven by values that are independent of the weather or how people treat them. Gandhi said, "They cannot take away our self respect if we do not give it to them." Our response to what happened to us affects us more than what actually happened. We can choose to use difficult situations to build our character and develop the ability to better handle such situations in the future.

Proactive people use their resourcefulness and initiative to find solutions rather than just reporting problems and waiting for other people to solve them.

Being proactive means assessing the situation and developing a positive response for it. Organizations can be proactive rather than be at the mercy of their environment. For example, a company operating in an industry that is experiencing a downturn can develop a plan to cut costs and actually use the downturn to increase market share.

Once we decide to be proactive, exactly where we focus our efforts becomes important. There are many concerns in our lives, but we do not always have control over them. One can draw a circle that represents areas of concern, and a smaller circle within the first that represents areas of control. Proactive people focus their efforts on the things over which they have influence, and in the process often expand their area of influence. Reactive people often focus their efforts on areas of concern over which they have no control. Their complaining and negative energy tend to shrink their circle of influence.

In our area of concern, we may have direct control, indirect control, or no control at all. We have direct control over problems caused by our own behavior. We can solve these problems by changing our habits. We have indirect control over problems related to other people's behavior. We can solve these problems by using various methods of human influence, such as empathy, confrontation, example, and persuasion. Many people have only a few basic methods such as fight or flight. For problems over which we have no control, first we must recognize that we have no control, and then gracefully accept that fact and make the best of the situation.

SUMMARY OF THE SEVEN HABITS

Habit 1: Be Proactive

Change starts from within, and highly effective people make the decision to improve their lives through the things that they can influence rather than by simply reacting to external forces.

Habit 2: Begin with the End in Mind

Develop a principle-centered personal mission statement. Extend the mission statement into long-term goals based on personal principles.

Habit 3: Put First Things First

Spend time doing what fits into your personal mission, observing the proper balance between production and building production capacity. Identify the key roles that you take on in life, and make time for each of them.

Habit 4: Think Win/Win

Seek agreements and relationships that are mutually beneficial. In cases where a "win/win" deal cannot be achieved, accept the fact that agreeing to make "no deal" may

be the best alternative. In developing an organizational culture, be sure to reward win/win behavior among employees and avoid inadvertantly rewarding win/lose behavior.

Habit 5: Seek First to Understand, Then to Be Understood

First seek to understand the other person, and only then try to be understood. Stephen Covey presents this habit as the most important principle of interpersonal relations. Effective listening is not simply echoing what the other person has said through the lens of one's own experience. Rather, it is putting oneself in the perspective of the other person, listening empathically for both feeling and meaning.

Habit 6: Synergize

Through trustful communication, find ways to leverage individual differences to create a whole that is greater than the sum of the parts. Through mutual trust and understanding, one often can solve conflicts and find a better solution than would have been obtained through either person's own solution.

Habit 7: Sharpen the Saw

Take time out from production to build production capacity through personal renewal of the physical, mental, social/emotional, and spiritual dimensions. Maintain a balance among these dimensions.

THE TRUSTED LEADER

Trust is a vital ingredient in organizations since they represent a type of ongoing relationship. In their book The Trusted Leader, Robert Galford and Anne Seibold Drapeau analyze this important aspect of leadership and offer models for understanding trust and how to build it.

Galford and Drapeau identified three categories of trust within an organization:

Strategic trust - trust in the organization's mission, strategy, and ability to succeed.

Organizational trust - trust that the organization's policies will be fairly administered and implemented as stated.

Personal trust - trust that subordinates place in their manager to be fair and to look out for their interests.

In The Trusted Leader, Galford and Drapeau focus primarily on building personal and organizational trust.

Trust reduces unproductive rumors and second guessing that distracts employees from their work. It motivates, stimulates creativity, and helps the organization to attract and retain great employees.

Modeling Trust

Galford and Drapeau offer the following equation to model trust:

Trustworthiness = (C + R + I) / S

where

C = credibility
R = reliability
I = intimacy
S = self-orientation

These characteristics are described as follows:

Credibility is earned by expertise, by the ability to obtain the required expertise, and by being up-front about one's limitations.

Reliability is consistency and dependability. Reliable leaders provide a sense of comfort to their subordinates.

Intimacy is not about revealing personal details, but rather, making the business of the organization personal and understanding the sensitivities of others.

Self-orientation is the degree to which one focuses on one's own concerns when interacting with others. Self-orientation decreases trustworthiness. Those who are motivated by duty or achievement tend to be more self-oriented than those motivated by meaning or who gain pleasure from the work itself.

Enemies of Trust

While the above formula provides some insight, building trust is not an endeavor performed in isolation. Rather, building trust is an effort of defending trust from its enemies. A lone trusted leader cannot succeed in an untrustworthy environment because such a leader will become a target and eventually be brought down.

Galford and Drapeau identified 22 enemies of trust, each of which can be classified in one of the following categories:

- Inadequate communication
- Misbehavior
- Unremedied situations

Building Personal Trust

To build personal trust, Galford and Drapeau present a five stage process:

1. Engaging - finding common ground and relating to other people, for example, by appreciating the key challenges that employees face in their jobs.

2. Listening - builds trust by showing that one cares enough to invest the time to listen. Asking thoughtful questions, getting clarification when necessary, and giving one's complete attention to the conversation all send the message that one cares about the other person.

3. Framing - making sure that one understands the core of what the other person is conveying, and letting him or her know it.

4. Envisioning - looking to the future and identifying an optimistic and achievable outcome, and helping the other person to visualize the benefits of that outcome.

5. Committing - both parties agree and commit to moving toward the envisioned future.

Building Organizational Trust

Organizational trust is based on belief in the way things are done in the organization. While organizational trust requires personal trust in the organization's leaders on an aggregate basis, it is possible to have an untrustworthy supervisor and still believe in the organization.

Galford and Drapeau identified five variables on which organizational trust depends, as shown in the following equation:

Organizational Trustworthiness = ((A1 + A2 + A3) x (A4 + A5)) / R

where

A1 = Aspirations
A2 = Abilities
A3 = Actions
A4 = Alignment
A5 = Articulation
R = Resistance

These variables are described as follows:

Aspirations - aspirations provide the incentive for people in the organization to want to trust each other. Aspirations is another term for business vision.

Abilities - are the resources and capabilities required to fulfill the aspirations.

Actions - actually getting to the task and doing what is needed to reach the organizational goals rather than losing focus to the distractions that inevitably will arise.

Alignment - having consistency between aspirations, abilities, and actions.

Articulation - communicating the aspirations, abilities, actions, and alignment so that everybody in the organization knows them and is able to articulate them.

Resistance - building a trusting organization is likely to be met with resistance in the form of skepticism, fear, frustration, and a "we-they" mindset.

In the organizational trust formula, resistance is unique because it stands alone in the denominator; thus it is crucial to minimize it. Galford and Drapeau propose that resistance is best conquered by long-term action designed to directly address the issues behind the resistance.

INSIDE CHINESE BUSINESS: A GUIDE FOR MANAGERS WORLDWIDE

Summary of Ming-Jer Chen's Book

Note: The following text is a summary of part of Ming-Jer Chen's book. We recommend that you purchase the book in order to benefit from the full depth of the author's own words.

Chapter 1. Introduction: Who (and Where) are the Chinese?

Many non-Chinese find the behavior of Chinese business people to be difficult to understand. To understand it, one must understand Chinese culture.
While China is a diverse country, it also has a large degree of unity. While there are 200 dialects, there is a common written language. 90% of the population belongs to a single ethnic group called the Han. Perhaps the most important source of unity is Confucianism, which has endured for more than 2500 years. Confucianism governs every relationship, including business ones.

Even when the Chinese emigrate from China and become citizens of other countries, most still consider themselves to be Chinese, even after several generations. Many of those who left China before the 1949 revolution consider themselves more Chinese than those in China today because the emigrants did not experience the communist assaults on their traditional values.

Chinese culture and institutions seem vastly different to Westerners, but Western culture seems vastly different to the Chinese. By understanding these differences, we better can develop a global perspective.

Chapter 2. Family Businesses, Business Families

According to a famous saying, when a Chinese individual is honored, his whole family is honored. When he is condemned, his whole family is condemned.

The family had a practical use in China's agrarian society, but Confucius added a moral dimension and broadened it to mutually dependent societal relationships. Every person has an important role as a link in the network of society.

The family is the foundation of Chinese organizations, including business ones. In the West, one often refers to "family businesses". For the Chinese, the term "business families" may be more appropriate since the family comes first and the business comes second. Rather than creating wealth, the Chinese tend to see their business duties more as responsibilities to the family.

For Chinese living outside the PRC, the family-based business model is strong. In mainland China, the family-based model of business diminished as communist rulers

attempted to replace family loyalty with loyalty to the party. More recently, the increase in the number of non-state businesses, many of which are family-run, has helped the family model of business to reappear.

Four features of Chinese business families are that they are family-directed, there is a dominant family head, it has enduring roles and family obligations, and it is family-financed and family accountable.

Family-Directed Operation
As a family directed operation, the typical Chinese business family is headed by a patriarchal or matriarchal figure, often who is the founder of the business. The other family members have key positions. The extended family may have its own companies that are linked together to form a complex network. Cross-holdings are common but are not always apparent since knowledge of such holdings often is kept private.

Even when a Chinese business is a publicly held corporation, it often is family controlled. The family members generally take a hands-on approach in the affairs of the business. Decision-making is informal and often occur at events such as family dinners.

The organizational chart does not necessarily provide information about who actually holds the power; often a person with an influential-sounding title may be only a figurehead. Business deals may be based on family reasons, which sometimes may cause a financially attractive deal to be rejected.

Dominant Family Head

Chinese business families usually are controlled by a dominant family head who has the final word on important decisions. This person may have advisors who are family members or close friends. Such relationships are more important than what the organizational chart may imply. Often a lower level manager will go straight to the head without going up through the chain of command. Western companies dealing with the Chinese will benefit if they take the time to find out who really holds the positions of power and influence in the Chinese firm.

Enduring Roles and Family Obligations

The heads of Chinese family businesses usually are succeeded by family members who carry the business tradition to the next generation. Even if nobody in the family has the skill to run the business, family members are preferred over outside professional managers.

Often, Chinese assets are divided among all of the sons, who may branch off into different industries. This has the effect of adding a higher degree of diversification to the business.

Family-Financed, Family-Accountable Corporation

The formal accounting in a Chinese business family tends to be for tax purposes, with the real books kept in the heads of family members. People are evaluated informally and personal reputation is more important than achievements. Decisions are made quickly, often based on personal recommendations.

The following table contrasts some of the key differences between traditional Chinese business practices and those of Western companies.

Western vs. Traditional Chinese Business Practices

Business Practice	*Western*	*Chinese*
Main company purpose	Maximize shareholder value	Serve family interests
Financial Openness	Public financial reports	Financial information is kept secret
Financial Sources	Public sale of securities	Family and friends of family
Transfer of Ownership	Mergers & unfriendly acquisitions	Companies are not sold due to family obligations
Advertising	Brand is promoted	Without advertising sales are made via the family network
Management	Professional management recruited on qualifications	Senior managers are recruited from within the family
Time Horizon	Short-term emphasis on bottom-line profits and shareholder value	Long-term family prestige is emphasized

The Chinese Business Family in Transition

While the traditional aspects of the Chinese business family are observed today, as markets become more global the traditional model is changing. Business families are beginning to adopt business practices that are more consistent with other companies around the world. For example, in addition to personal character, managers are being valued on other attributes such as industry knowledge.

Traditionally, passing a business to the next generation was a means of maintaining family heritage. Now, it is beginning to be seen as an opportunity for reorganization. Many new-generation family members receive Western education and are beginning to break away from the family network and conservatism.

Despite these changes, the sense of the family remains strong and it is likely that the family first, business second attitude will continue into the future.

Chapter 3. Networking and Guanxi

Whereas Western business culture is transaction-based, Chinese business culture is relationship-based. In the West, a successful business person is described as wealthy. The successful Chinese business person would be described as well-connected.

The conventional translation of the word guanxi is "connections", but there is more meaning to the word than that translation conveys. A more complete translation is connections with mutual obligation, goodwill, and personal affection with emphasis on family and shared experiences (such as college and military service).

Guanxi networks are a valuable source of information on issues for which the official channels are inadequate. In a society in which laws are not enforced uniformly, guanxi networks help businesses deal with one another. Overseas Chinese often rely on these networks when they are citizens in a society that treats them with suspicion.

The closest relationships are those of the immediate family. After that, the next closest are the extended family and very close friends who are treated as family. Such close friends do not have to be Chinese to be considered an insider. The next level of relationship is that between people with shared experiences, such as being former classmates. The final level of relationship is that with strangers, who often are looked upon with suspicion until they are known better. Even if one falls in this category, it still is possible to do business with the Chinese, though on a shorter-term basis unless the relationship evolves to something closer. Outsiders can reach more exclusive parts of the network through other people.

Guanxi relationships often result in favors that are expected to be returned, but by no specific date. Sometimes indebtedness from such favors lasts for generations, and the Chinese will remember for a long time a favor that was given to them when it especially was needed. When a favor is returned, it often is in greater measure. This swinging of the balance strengthens the guanxi relationship and carries it into the future.

Even if you are an outsider in a guanxi network you still are an insider in your own network. Rather than focusing on accessing another network, guanxi is more about cultivating your own network.

Overseas Chinese often can serve as a bridge for Westerners to access companies in China. If you are traveling to China, such as third parties may be able to provide you with contacts. They often will have you convey a greeting, and the more elaborate the greeting, the closer the contact is expected to consider you. A written letter would represent one of the more serious introductions as the foundation for a strong relationship. Be aware, however, that the Chinese sometimes resent Western-educated

Chinese and question their commitment to China. While it may help, being of Chinese origin does not necessarily unlock doors.

When meeting people, Westerners tend to ask someone about their profession. The Chinese tend to ask where you are from and then may ask if you know somebody thay they may know there. Such questions are intended to determine if there is perhaps a preexisting connection. Much goodwill can be generated if a close friend or relative of yours lived in the hometown of the person you are getting to know. While such commonalities are enjoyed by Westerners, for the Chinese they can be the basis of a very close guanxi relationship. If you do not have such commonalities, simply showing interest in the background of your acquaintance can show you care and can help develop the relationship.

One should be careful not to make your acquaintances think that you are trying to rush the development of the relationship. Knowing the Chinese appreciation of good food, many American business people pay for large banquets thinking that such generosity will establish strong connections. But goodwill must go deeper than simply picking up the tab, and such people often are referred to as a "meat and wine friend." While throwing dinners can help, showing sincerity and commitment to the relationship is more important.

It is important to note that guanxi networks are among individuals and not companies. When a person leaves a position, his replacement does not inherit the network. Sometimes companies will appoint the replacement far in advance so that he can be introduced to the network. If you are dealing with a Chinese company, it is worthwhile to extend your network beyond one person in the company. If that person were to leave, your account probably would be assumed by a replacement, but you might not have the same standing that you had before the departure.

Before establishing a guanxi relationship, it is a good idea to verify the person's reputation. Test them with something small first. Keep in mind that a guanxi relationship with somebody who has a bad reputation can lock you out of other guanxi.

For the Chinese, the giving of symbolic gifts can help to strengthen the relationship. The gift should be something that either considers the recipient's interests or that is a symbol of your own background, such as something from your own hometown. The gift should not be expensive, as it would be difficult to reciprocate and could embarrass the recipient.

Guanxi relationships should be maintained through a steady exchange of communication and favors. Favors should be repaid with slightly larger ones, but not too much larger or it will not represent a natural strengthening of the relationship.

A failed business deal does not mean the end of a guanxi relationship. Rather, it often strengthens it since surviving difficult times helps to bring people closer. The Chinese consider adversity to be the best test of a relationship.

Interest in the family of your guanxi partner helps to build and maintain the relationship. While Westerners often consider their family lives to be separate from their business ones, the Chinese do not draw this distinction. As such, the Chinese frequently exhibit family-like behavior in business settings. Asking about their parents, remembering their children's birthdays, and sending gifts to them help to build and maintain the relationship.

It is important to realize that the Chinese consider the impact of a decision not only on the transaction, but on the network, since maintaining relationships is more important than a single deal. For example, a firm may be overcharged by its supplier, but that same supplier may provide the firm with a larger profit on the next deal, or later may introduce the firm to new lucrative opportunities.

Since relationships are the central focus of Chinese business, a firm seeking to do business in China should make guanxi a part of its strategy, not just as an incidental, but as a strategic starting point.

The following table summarizes some of the differences between Western and Chinese networking.

Western vs. Chinese Networking

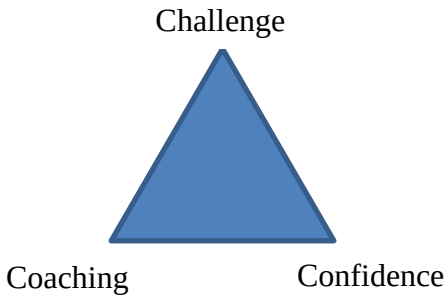
Networking	Western	Chinese
Motivation	Economic	Economic and Social
Formality	Formal and defined roles	Informal and flexible roles
Individual & Organization	Separate	Impact one another
Networked Organizations	Independence	Mutual dependence
Governing Authority	Contracts	Personal trust

This summary ends here. It has covered portions of only the first three chapters. The following is a list of the remaining chapters of the book:

THORNTON'S 3-C LEADERSHIP MODEL

Numerous theories have been put forth about the many aspects of leadership such as motivation, alignment, and empowerment. However, it is not obvious how these pieces fit together into a coherent model, if they do at all. As such, leadership has a reputation of being an art that is practiced by the lucky few who possess certain talents.

In his 1999 book, Be The Leader, Make The Difference, consultant Paul B. Thornton proposed an integrating framework that takes these various leadership ideas and transforms them into a model that quickly can be studied, understood, and implemented by managers in order to develop an effective leadership style and better lead their organizations. The model is based on the premise that leaders exist because individuals need guidance, without which they do not always know what they can accomplish, what they should accomplish, or how to accomplish it. To this end, leaders can provide challenge, confidence, and coaching. Thornton calls this framework the 3-C Leadership Model and depicted it as shown below.



This three vertex diagram illustrates the balanced relationship among the three 3-Cs of leadership: presenting a challenge, building confidence, and providing coaching.

Present a Challenge

Of the 3 aspects of leadership, challenge is the one that is practiced most widely by managers as they ask their employee's to set increasingly higher goals. Human nature is such that most people do not want to leave their comfort zone and therefore are inclined to suggest small, incremental improvements in their objectives. In today's competitive environment, such small improvements often are insufficient. Improvements of 30%, 50%, or even several hundred percent sometimes are required. There are many ways in which leaders can challenge their employees. They can:

Share their vision, inspiring them to believe that more is possible.

Set very high goals, forcing people to leave their comfort zones to find ways to achieve them.

Ask challenging questions that lead people to reconsider their assumptions about what is possible.

Use benchmarking to reveal the best practices of others and use these as a challenge.

Provide a wide variety of assignments. Many firms make it a policy to expose their employees to a wide range of aspects of the firm. Each new position is a new challenge that develops the employee further.
Once success is achieved, it is important continue raising the bar in order to fight the temptation to rest on one's laurels.
Build Confidence

A challenge brings people out of their comfort zones, often resulting in a drop in their confidence level. Without confidence, the challenging goals that caused the drop in confidence in the first place become even more difficult to reach. Therefore, a major responsibility of a leader is to build confidence in his or her employees so that they will believe in their ability to reach their objectives.

Many motivation experts make the case for positive thinking and self-affirmation as a means of building confidence. Paul Thornton argues that simply thinking something does not make it reality, and that a person achieves genuine self-confidence not by repeating affirmations but by actually working and achieving something. In the process of achievement we expand our abilities, and these expanded abilities create a more genuine, lasting confidence.

With this philosophy in mind, leaders can instill real confidence in their employees by:
Recognizing and rewarding positive accomplishments rather than focusing on deficiencies.

Providing professional development in order to build confidence through competence.

Empowering them by providing both responsibility and authority, thereby expressing confidence in them.

Verbally expressing confidence in them.

Reminding them of past successes that may have faded from their consciousness in the face of new challenges.
Provide Coaching

Coaching is the process of advising people in a way that facilitates their success. It may take various forms, from training to offering a broader perspective. Coaching can help employees to better understand how their efforts fit into the larger strategy, thereby allowing them to make better decisions.

Leaders may coach employees by:

- Providing feedback immediately after the employee performs some important task such as meeting with a client or delivering a presentation.

- Showing them the best practices of others as examples of how tasks can be accomplished.

- Posing carefully formulated questions designed to improve their understanding by leading them to think through the situation.

- Setting an example, especially one of continual self-improvement.
- Overcoaching should be avoided as it can create dependent employees, reduce their initiative, and cause them to feel micro-managed.

Relationship Among the 3-Cs

The triangle diagram is particularly appropriate for depicting the 3-C Leadership Model because there is no single "correct" order and because balance among the three vertices is important.

The 3-Cs do not need to occur in any specific order. For example, the leader may choose first to present a challenge, then to build the confidence needed to meet the challenge, followed by coaching. Alternatively, the leader first may build the team's confidence, then present the grand challenge.

A proper balance among the 3-Cs is important. Consider the balance between confidence and challenge. A significant challenge without enough confidence likely would result in failure. Conversely, high confidence with little challenge would result in under-utilization of one's abilities and boredom. In the case of insufficient confidence, coaching can be used to improve the employee's skills and thus build confidence. In the case of insufficient challenge, the employee may need to be offered an assignment that better utilizes his or her capabilities.

When the right balance is achieved, employees will experience a higher degree of effectiveness and satisfaction in their work.

MANAGEMENT INFORMATION SYSTEMS:

DATABASE: PATIENT INFORMATION

We all have computers in our office.

COMMUNICATION

Communication is essential in a practice and the larger it gets, the easier it gets for miscommunication. If this is leading to missed treatment or failure to make appointments, this can lead to a reduction in income and even worse, below standard care to your patients who deserve better.

DATA MINING

Our practice management software has a tonne of untapped information. If you are simply using the software for appointment booking and managing the transactions, you are doing a tremendous dis-service to yourself.

ADVERTISING MANAGEMENT:

Advertising is a branch of marketing which deals with the use of a number of media outlets in order to get your message out there to strengthen your market position within a certain niche.

- Mission & Vision Statement
- Tracking Marketing Efforts
- Marketing Information File
- Creative Brief – SWOT etc;

FINANCIAL ACCOUNTING:

INTRODUCTION

The purpose of accounting is to provide the information that is needed for sound economic decision making. The main purpose of financial accounting is to prepare financial reports that provide information about a firm's performance to external parties such as investors, creditors, and tax authorities. Managerial accounting contrasts with financial accounting in that managerial accounting is for internal decision making and does not have to follow any rules issued by standard-setting bodies. Financial accounting, on the other hand, is performed according to Generally Accepted Accounting Principles (GAAP) guidelines.

CPA's

The primary accounting professional association in the U.S. is the American Institute of Certified Public Accountants (AICPA). The AICPA prepares the Uniform CPA Examination, which must be completed in order to become a certified public accountant. To be eligible to become a CPA, one needs an undergraduate degree in any major with 150 credit hours of course work. Of these 150 credit hours, a minimum of 36 credit hours must be in accounting. Only about 10% of those taking the CPA exam pass it the first time.

Accounting Standards

In order that financial statements report financial performance fairly and consistently, they are prepared according to widely accepted accounting standards. These standards are referred to as Generally Accepted Accounting Principles, or simply GAAP. Generally Accepted Accounting Principles are those that have "substantial authoritative support".

Accrual vs. Cash Method

Many small businesses utilize an accounting system that recognizes revenue and expenses on a cash basis, meaning that neither revenue nor expenses are recognized until the cash associated with them actually is received. Most larger businesses, however, use the accrual method.

Under the accrual method, revenues and expenses are recorded according to when they are earned and incurred, not necessarily when the cash is received or paid. For example, under the accrual method revenue is recognized when customers are invoiced, regardless of when payment is received. Similarly, an expense is recognized when the bill is received, not when payment is made.

Under accrual accounting, even though employees may be paid in the next accounting period for work performed near the end of the present accounting period, the expense still is recorded in the current period since the current period is when the expense was incurred.

Underlying Assumptions, Principles, and Conventions

Financial accounting relies on the following underlying concepts:

Assumptions: Separate entity assumption, going-concern assumption, stable monetary unit assumption, fixed time period assumption.

Principles: Historical cost principle, matching principle, revenue recognition principle, full disclosure principle.

Modifying conventions: Materiality, cost-benefit, conservatism convention, industry practices convention.

Financial Statements

Businesses have two primary objectives:

Earn a profit
Remain solvent

Solvency represents the ability of the business to pay its bills and service its debt.
The four financial statements are reports that allow interested parties to evaluate the profitability and solvency of a business. These reports include the following financial statements:

Balance Sheet
Income Statement
Statement of Owner's Equity
Statement of Cash Flows

These four financial statements are the final product of the accountant's analysis of the transactions of a business. A large amount of effort goes into the preparation of the financial statements. The process begins with bookkeeping, which is just one step in the accounting process. Bookkeeping is the actual recording of the company's transactions, without any analysis of the information. Accountants evaluate and analyze the information, making sense out of the numbers.

For the reports to be useful, they must be:

- Understandable
- Timely

- Relevant
- Fair and Objective (free from bias)

Double Entry Accounting

Financial accounting is based on double-entry bookkeeping procedures in which each transaction is recorded in opposite columns of the accounts affected by the exchange. Double entry accounting is a significant improvement over simple and more error-prone single-entry bookkeeping systems.

Fundamental Accounting Model

The balance sheet is based on the following fundamental accounting equation :

Assets = Liabilities + Equity

This model has been used since the 18th century. It essentially states that a business owes all of its assets to either creditors or owners, where the assets of a business are its resources, and the creditors and owners are the sources of those resources.

The accounting equation holds at all times over the life of the business. When a transaction occurs, the total assets of the business may change, but the equation will remain in balance. The accounting equation serves as the basis for the balance sheet, as illustrated in the following example.

Transactions

To record transactions, one must:

- Identify an event that affects the entity financially.
- Measure the event in monetary terms.
- Determine which accounts the transaction affects.
- Determine whether the transaction increases or decreases the balances in those accounts.
- Record the transaction in the ledgers.

Most larger business accounting systems utilize the double entry method. Under double entry, instead of recording a transaction in only a single account, the transaction is recorded in two accounts.

The Accounting Process

Once a business transaction occurs, a sequence of activities begins to identify and analyze the transaction, make the journal entries, etc. Because this process repeats over transactions and accounting periods, it is referred to as the accounting cycle.

ACCOUNTING CONCEPTS; UNDERLYING ASSUMPTIONS, PRINCIPLES, AND CONVENTIONS

Financial accounting relies on several underlying concepts that have a significant impact on the practice of accounting.

Assumptions

The following are basic financial accounting assumptions:

Separate entity assumption - the business is an entity that is separate and distinct from its owners, so that the finances of the firm are not co-mingled with the finances of the owners.

Going concern assumption - the business is going to be operating for the foreseeable future.

Stable monetary unit assumption - e.g. the U.S. dollar

Fixed time period assumption - info prepared and reported periodically (quarterly, annually, etc.)

Principles

The basic assumptions of accounting result in the following accounting principles:

Historical cost principle - assets are reported and presented at their original cost and no adjustment is made for changes in market value. One never writes up the cost of an asset. Accountants are very conservative in this sense. Sometimes costs are written down, for example, for some short-term investments and marketable securities, but costs never are written up.

Matching principle - matching of revenues and expenses in the period earned and incurred.

Revenue recognition principle - revenue is realized (reported on the books as earned) when everything that is necessary to earn the revenue has been completed.

Full disclosure principle - all of the information about the business entity that is needed by users is disclosed in understandable form.

Modifying Conventions

Due to practical constraints and industry practice, GAAP principles are not always applied strictly but are modified as necessary. The following are some commonly observed modifying conventions:

Materiality convention - a modifying convention that relaxes certain GAAP requirements if the impact is not large enough to influence decisions. Users of the information should not be overburdened with information overload.

Cost-benefit convention - a modifying convention that relaxes GAAP requirements if the expected cost of reporting something exceeds the benefits of reporting it.

Conservatism convention - when there is a choice of equally acceptable accounting methods, the firm should use the one that is least likely to overstate income or assets.

Industry practices convention - accepted industry practices should be followed even if they differ from GAAP.

SINGLE ENTRY BOOKKEEPING

Most of financial accounting is based on double-entry bookkeeping. To understand and appreciate the advantages of double entry, it is worthwhile to examine the simpler single-entry bookkeeping system. In its most basic form, a single-entry system is similar to a checkbook register and is characterized by the fact that there is only a single line entered in the journal for each transaction. In a simple checkbook, each transaction is recorded in one column of an account as either a positive or a negative amount in order to represent the receipt or disbursement of cash. This system is demonstrated in the following example for a dental practice:

Single Column System

Date	Description	Amount
Jan 1	Beginning Balance	$1000
Jan 2	Purchased dental supplies	($150)
Jan 4	#8 MIVL Restoration	$275
Jan 7	Scaling x 30 minutes	$125
Jan 15	Paid phone bill	($50)
Jan 30	Ending Balance	$1200

While extremely simple, because the above system uses a single column, only the difference between revenues and expenses is totaled - not the individual values of each. Knowing the individual total amounts of revenues and expenses is important to a business, for example, when formulating a budget. The revenues and expenses also are reported in the income statement. In the above example, the individual revenue and expense amounts can be determined only by sorting through the transactions and tabulating the revenue and expense totals. This process can be designed into the system by using a separate column for revenues and expenses:

Separating Revenues and Expenses

Date	Description	Revenues	Expenses
Jan 2	Purchased dental supplies		$150
Jan 4	#8 MIVL Restoration	$275	
Jan 7	Scaling x 30 minutes	$125	
Jan 15			$125
	January Totals	**$400**	**$200**

While the above example now uses two columns, it still is considered to be a single-entry system since only one line is used to record each transaction in the cash account. This single-entry system often is expanded to provide more useful information. For example, additional columns can be added to classify the revenues as sales and sales tax collected, and the expenses as rent, utilities, supplies, etc. Some single-entry systems may add dozens of columns for different types of revenues and expenses. Many small businesses

utilize such a system. However, even with columns to classify the revenues and expenses, single-entry bookkeeping is limited in its ability to provide detailed financial information. Some disadvantages of a single-entry system include:

Does not track asset and liability accounts such as inventory, accounts receivable and accounts payable. These must be tracked separately.

Facilitates the calculation of income but not of financial position. There is no direct linkage between income and the balance sheet.

Errors may go undetected and often are identified only through bank statement reconciliation.

Because of these drawbacks, a single-entry system is not practical for many organizations such as those having many thousands of transactions in a reporting period, significant assets, and external suppliers of capital. The more sophisticated double-entry bookkeeping system addresses the more demanding needs of such businesses.

DOUBLE ENTRY BOOKKEEPING

A business transaction involves an exchange between two accounts. For example, for every asset there exists a claim on that asset, either by those who own the business or those who loan money to the business. Similarly, the sale of a product affects both the amount of cash (or cash receivable) held by the business and the inventory held.

Recognizing this fundamental dual nature of transactions, merchants in medieval Venice began using a double-entry bookkeeping system that records each transaction in the two accounts affected by the exchange. In the late 1400's, Franciscan monk and mathematician Luca Pacioli documented the procedure for double-entry bookkeeping as part of his famous Summa work, which described a significant portion of the accounting cycle. Double-entry bookkeeping spread throughout Europe and became the foundation of modern accounting.

Two notable characteristics of double-entry systems are that 1) each transaction is recorded in two accounts, and 2) each account has two columns.

In a double-entry system, two entries are made for each transaction - one entry as a debit in one account and the other entry as a credit in another account. The two entries keep the accounting equation in balance so that:

Assets = Liabilities + Owners' Equity

To illustrate, consider the previous example written in the previous section.

A notation may be added to this journal entry to indicate that the revenue was from dental services.

Note that two accounts (revenue and cash) are affected by the transaction. If the customer did not pay cash but instead was extended credit, then "accounts receivable" would have been used instead of "cash."

In this system, the double entries take the form of debits and credits, with debits in the left column and credits in the right. For each debit there is an equal and opposite credit and the sum of all debits therefore must equal the sum of all credits. This principle is useful for identifying errors in the transaction recording process.

Double-entry accounting has the following advantages over single-entry:

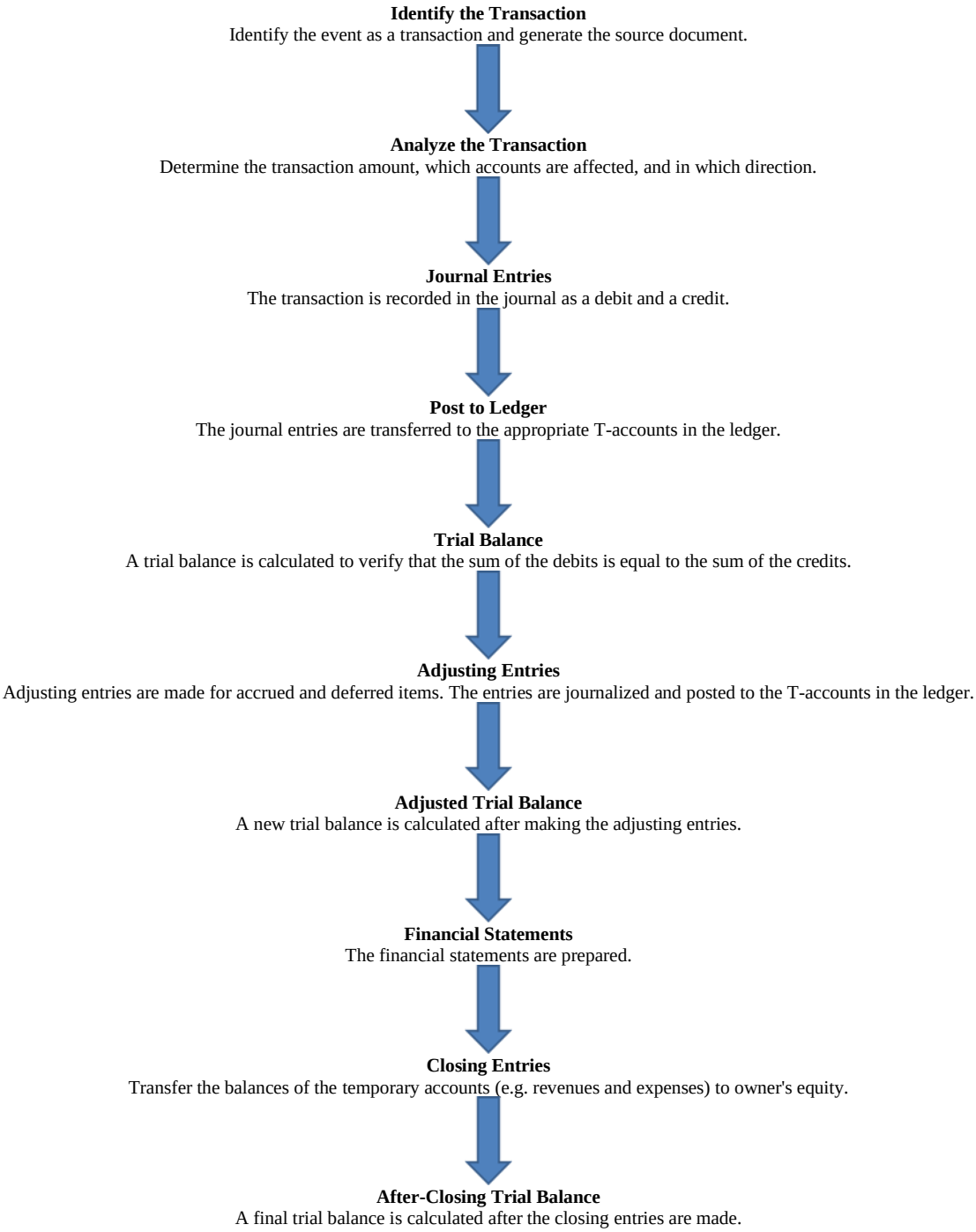
Accurate calculation of profit and loss in complex organizations
Inclusion of assets and liabilities in the bookkeeping accounts.
Preparation of financial statements directly from the accounts
Easier detection of errors and fraud

To appreciate the importance of double-entry bookkeeping, it is interesting to note that the industrial revolution might not have been possible without it. At that time, businesses increased in size and complexity. Accurate bookkeeping was required for managers to understand the financial status of their businesses in order to keep them solvent and offer a degree of transparency to investors. While a single-entry system can be adapted by a skilled bookkeeper to meet some of these needs, only a double-entry system provides the required detail systematically and by design.

THE ACCOUNTING CYCLE

The sequence of activities beginning with the occurrence of a transaction is known as the accounting cycle. This process is shown in the following diagram:

Steps in The Accounting Cycle



The above diagram shows the financial statements as being prepared after the adjusting entries and adjusted trial balance. The financial statements also can be prepared before the adjusting entries with the help of a worksheet that calculates the impact of the adjusting entries before they actually are posted.

THE SOURCE DOCUMENT

When a business transaction occurs, a document known as the source document captures the key data of the transaction. The source document describes the basic facts of the transaction such as its date, purpose, and amount.

Some examples of source documents:

- cash receipt
- cancelled check
- invoice sent or received
- credit memo for a customer refund
- employee time sheet

The source document is the initial input to the accounting process and serves as objective evidence of the transaction, serving as part of the audit trail should the firm need to prove that a transaction occurred.

To facilitate referencing, each source document should have a unique identifier, usually a number or alphanumeric code. Pre-numbering of commonly-used forms helps to enforce numbering, to classify transactions, and to identify and locate missing source documents. A well-designed source document form can minimize errors and improve the efficiency of transaction recording.

The source document may be created in either paper or electronic format. For example, automated accounting systems may generate the source document electronically or allow paper source documents to be scanned and converted into electronic images. Accounting software often provides on-screen entry forms for different types of transactions to capture the data and generate the source document.

The source document is an early document in the accounting cycle. It provides the information required to analyze and classify the transaction and to create the journal entries.

JOURNAL ENTRIES

After a transaction occurs and a source document is generated, the transaction is analyzed and entries are made in the general journal. A journal is a chronological listing of the firm's transactions, including the amounts, accounts that are affected, and in which direction the accounts are affected. A journal entry takes the following format:

Format of a General Journal Entry

DATE	ACCOUNTS	DEBIT	CREDIT
mm/dd	Account to be debited	xxxx.xx	
	Account to be credited		xxxx.xx

In addition to this information, a journal entry may include a short notation that describes the transaction. There also may be a column for a reference number so that the transaction can be tracked through the accounting system.

The above format shows the journal entry for a single transaction. Additional transactions would be recorded in the same format directly below the first one, resulting in a time-ordered record. The journal format provides the benefit that all of the transactions are listed in chronological order, and all parts (debits and credits) of each transaction are listed together.

Because the journal is where the information from the source document first enters the accounting system, it is known as the book of original entry.

Compound Journal Entries

The format shown above has a single entry for the debit and a single entry for the credit. This type of entry is known as a simple journal entry. Sometimes, more than two accounts are affected by a transaction so more than two lines are required. Such a journal entry is know as a compound journal entry and takes the following format:

Format of a Compound General Journal Entry

DATE	ACCOUNTS	DEBIT	CREDIT
mm/dd	Account to be debited	xxxx.xx	
	Account to be credited		xxxx.xx
	Account to be credited		xxxx.xx

For example, if an expense is incurred in which part of the expense is paid with cash and the remainder placed in accounts payable, then two lines would be used for the credit - one for the cash portion and one for the accounts payable portion. The total of the two credits must be equal to the debit amount.

As many accounts as are necessary can be used in this manner, and multiple accounts also can be used for the debit side if needed.

Special Journals

The general journal is the main journal for a wide range of transactions. Of these, a business usually finds itself performing some types much more frequently than others. By grouping specific types of transactions into their own special journal, the efficiency and organization of the accounting system can be improved.

Some commonly-used special journals:

- sales journal
- purchases journal
- cash receipts journal
- cash disbursements journal

While a special journal may be organized differently from the general journal, it still provides the core transaction information such as date, debits and credits, and the relevant accounts.

From Journal Entry to Ledger Posting

Once the source document is generated and the appropriate journal entry is made, the next step in the accounting cycle is to post the entry to the general ledger.

THE GENERAL LEDGER

While the journal lists transactions in chronological order, its format does not faciliate the tracking of individual account balances. The general ledger is used for this purpose.

The general ledger is a collection of T-accounts to which debits and credits are transferred. The action of recording a debit or credit in the general ledger is referred to as posting. The posting of a journal entry to the general ledger accounts is a purely mechanical process using information already in the journal entry and requiring no additional analysis.

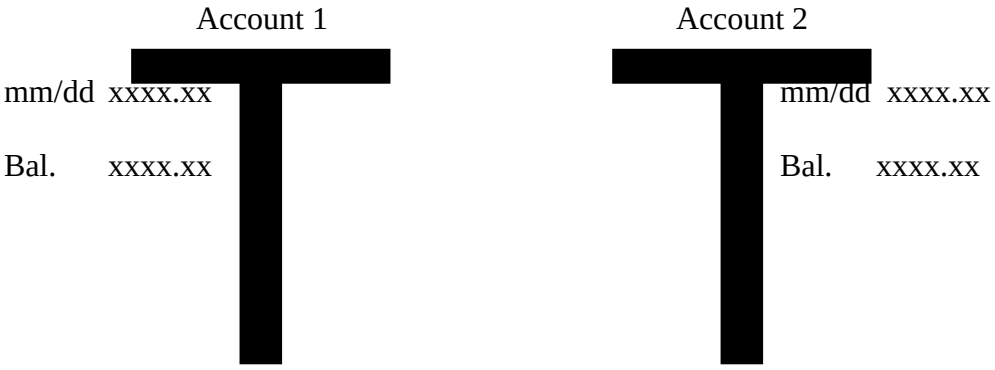
To understand the posting process, consider a journal entry in the following format:

General Journal Entry

Date	Accounts	Debit	Credit
mm/dd	Account 1	xxxx.xx	
	Account 2		xxxx.xx

There are two ledger accounts affected by the above journal entry (Account 1 and Account 2). Each of these accounts is represented by a T-account in the general ledger. To post the entry to the ledger, simply transfer the information to the T-accounts:

Ledger Accounts



Note that the debit portion of the journal entry is posted to the left side of its associated T-account, and the credit portion is posted to the right side of its T-account. The date helps to identify the transactions with the journal entries. Additionally, a reference number may be added to further facilitate cross-referencing.

Because the general ledger is organized by account, it allows one to view the activity and balance of any account at a glance.

DEBITS AND CREDITS

In double entry accounting, rather than using a single column for each account and entering some numbers as positive and others as negative, we use two columns for each account and enter only positive numbers. Whether the entry increases or decreases the account is determined by choice of the column in which it is entered. Entries in the left column are referred to as debits, and entries in the right column are referred to as credits.

Two accounts always are affected by each transaction, and one of those entries must be a debit and the other must be a credit of equal amount. Actually, more than two accounts can be used if the transaction is spread among them, just as long as the sum of debits for the transaction equals the sum of credits for it.

The double entry accounting system provides a system of checks and balances. By summing up all of the debits and summing up all of the credits and comparing the two totals, one can detect and have the opportunity to correct many common types of bookkeeping errors.

To avoid confusion over debits and credits, avoid thinking of them in the way that they are used in everyday language, which often refers to a credit as increasing an account and a debit as decreasing an account. For example, if our bank credits our checking account, money is added to it and the balance increases. In accounting terms, however, if a transaction causes a company's checking account to be credited, its balance decreases. Moreover, crediting another company account such as accounts payable will increase its balance. Without further explanation, it is no wonder that there often is confusion between debits and credits.

The confusion can be eliminated by remembering one thing. In accounting, the verbs "debit" and "credit" have the following meanings:

Debit	**Credit**
"Enter in the left column of"	"Enter in the right column of"

Thats all. Debit refers to the left column; credit refers to the right column. To debit the cash account simply means to enter the value in the left column of the cash account. There are no deeper meanings with which to be concerned.

The reason for the apparent inconsistency when comparing everyday language to accounting language is that from the bank customer's perspective, a checking account is an asset account. From the bank's perspective, the customer's account appears on the balance sheet as a liability account, and a liability account's balance is increased by crediting it. In common use, we use the terminology from the perspective of the bank's books, hence the apparent inconsistency.

Whether a debit or a credit increases or decreases an account balance depends on the type of account. Asset and expense accounts are increased on the debit side, and liability, equity, and revenue accounts are increased on the credit side. The following chart serves as a graphical reference for increasing and decreasing account balances:

TRIAL BALANCE

A basic rule of double-entry accounting is that for every credit there must be an equal debit amount. From this concept, one can say that the sum of all debits must equal the sum of all credits in the accounting system. If debits do not equal credits, then an error has been made. The trial balance is a tool for detecting such errors.

The trial balance is calculated by summing the balances of all the ledger accounts. The account balances are used because the balance summarizes the net effect of all of the debits and credits in an account. To calculate the trial balance, construct a table in the following format:

INSERT THE EXAMPLE TABLE

In the above trial balance, the balances of Accounts 1, 2, and 3 are net debits, and the balances of Accounts 4, 5, and 6 are net credits. The totals of the debits and credits should be equal; if they are not, then an error was made somewhere in the accounting process. Some common errors include the following:

1. Error in totaling the columns - make sure that the trial balance columns were summed properly.

2. Error in transferring account balances to proper trial balance columns - make sure that debit and credit account balances are in the appropriate debit and credit columns of the trial balance calculation. Check for reversed digits and misplaced decimal points.

3. Omission of an account - an account may be missing in the trial balance calculation.

4. Error in account balance - an error may have been made in the calculation of a ledger account balance.

5. Error in posting a journal entry - a journal entry may not have been posted properly to the general ledger.

6. Error in recording a transaction in the journal - for example, making an error in a debit or credit, or failing to enter a debit or credit.

In general, the most effective way to isolate an error is to work backward from the trial balance itself to the initial journal entry, as outlined in the above list.

Note that a balanced trial balance does not guarantee that there are no errors. An error of omission could have been made in which a transaction was not recorded, a journal entry

could have been posted to the wrong ledger account, or a debit and credit could have been transposed. Such errors are not caught by the trial balance.

ADJUSTING ENTRIES

In the accounting process, there may be economic events that do not immediately trigger the recording of the transaction. These are addressed via adjusting entries, which serve to match expenses to revenues in the accounting period in which they occur. There are two general classes of adjustments:

Accruals - revenues or expenses that have accrued but have not yet been recorded. An example of an accrual is interest revenue that has been earned in one period even though the actual cash payment will not be received until early in the next period. An adjusting entry is made to recognize the revenue in the period in which it was earned.

Deferrals - revenues or expenses that have been recorded but need to be deferred to a later date. An example of a deferral is an insurance premium that was paid at the end of one accounting period for insurance coverage in the next period. A deferred entry is made to show the insurance expense in the period in which the insurance coverage is in effect.

How to Make Adjusting Entries

Like regular transactions, adjusting entries are recorded as journal entries. The following illustrates adjustments for accrued and deferred items.

Accrued Items

As an example of an accrued item, consider the accrual of interest revenue. The journal entry would be similar to the following:

Adjusting Entry for Interest Accrual

Date	Accounts	Debit	Credit
mm/dd	Interest Receivable	xxxx.xx	
	Interest Revenue		xxxx.xx

The date of the above entry would be at the end of the period in which the interest was earned. The adjusting entry is needed because the interest was accrued during that period but is not payable until sometime in the next period. The adjusting entry is posted to the general ledger in the same manner as other journal entries.

In the next period when the cash is actually received, one makes the following journal entry:

Journal Entry for Interest Received

Date	Accounts	Debit	Credit
mm/dd	Cash	xxxx.xx	
	Interest Receivable		xxxx.xx

Deferred Items

For deferrals, a journal entry already has been made in asset or liability accounts and an adjusting entry is needed to move the balances to expense or revenue accounts in the next accounting period. Consider the case in which the firm prepays insurance premiums in one period for insurance coverage in the next period. The journal entry made at the time of payment would be similar to the following:

Journal Entry for Prepaid Insurance

Date	Accounts	Debit	Credit
mm/dd	Prepaid Insurance	xxxx.xx	
	Cash		xxxx.xx

In the next period when the insurance coverage is in effect, one makes the following adjusting entry:

Adjusting Entry for Prepaid Insurance

Date	Accounts	Debit	Credit
mm/dd	Insurance Expense	xxxx.xx	
	Prepaid Insurance		xxxx.xx

For a single deferred item, there may be several adjusting entries over subsequent accounting periods as the expense or revenue for the item is recognized over time.

CLOSING ENTRIES

Revenue, expense, and capital withdrawal (dividend) accounts are temporary accounts that are reset at the end of the accounting period so that they will have zero balances at the start of the next period. Closing entries are the journal entries used to transfer the balances of these temporary accounts to permanent accounts.

After the closing entries have been made, the temporary account balances will be reflected in the Retained Earnings (a capital account). However, an intermediate account called Income Summary usually is created. Revenues and expenses are transferred to the Income Summary account, the balance of which clearly shows the firm's income for the period. Then, Income Summary is closed to Retained Earnings.

The sequence of the closing process is as follows:

1. Close the revenue accounts to Income Summary.
2. Close the expense accounts to Income Summary.
3. Close Income Summary to Retained Earnings.
4. Close Dividends to Retained Earnings.

The closing journal entries associated with these steps are demonstrated below. The closing entries may be in the form of a compound journal entry if there are several accounts to close. For example, there may be dozens or more of expense accounts to close to Income Summary.

1. Close Revenue to Income Summary

The balance of the revenue account is the total revenue for the accounting period. Since revenue is one of the components of the income calculation (the other component being expenses), in the last day of the accounting period it is closed to the Income Summary account as follows:

Closing Entry : Revenue to Income Summary

Date	Accounts	Debit	Credit
mm/dd	Revenue	xxxx.xx	
	Income Summary		xxxx.xx

Once this closing entry is made, the revenue account balance will be zero and the account will be ready to accumulate revenue at the beginning of the next accounting period.

2. Close Expenses to Income Summary

Expenses are the other component of the income calculation and like revenue, are closed to the Income Summary account:

Closing Entry : Expenses to Income Summary

Date	Accounts	Debit	Credit
mm/dd	Income Summary	xxxx.xx	
	Expenses		xxxx.xx

After closing, the balance of Expenses will be zero and the account will be ready for the expenses of the next accounting period. At this point, the credit column of the Income Summary represents the firm's revenue, the debit column represents the expenses, and balance represents the firm's income for the period.

3. Close Income Summary to Retained Earnings

The income or loss for the period ultimately adds to or subtracts from the firm's capital. The Retained Earnings account is a capital account that accumulates the income from each accounting period. The Income Summary account is closed to Retained Earnings as follows:

Closing Entry : Income Summary to Retained Earnings

Date	Accounts	Debit	Credit
mm/dd	Income Summary	xxxx.xx	
	Retained Earnings		xxxx.xx

4. Close Dividends to Retained Earnings

Any capital withdrawals (e.g. dividends paid) during the period will reduce the capital account balance, so the withdrawal is closed to Retained Earnings:

Closing Entry : Dividends to Retained Earnings

Date	Accounts	Debit	Credit
mm/dd	Retained Earnings	xxxx.xx	
	Dividends		xxxx.xx

After closing, the dividend account will have a zero balance and be ready for the next period's dividend payments.

Posting of the Closing Entries

As with other journal entries, the closing entries are posted to the appropriate general ledger accounts. After the closing entries have been posted, only the permanent accounts in the ledger will have non-zero balances.

Post-Closing Trial Balance

Once the closing entries have been posted, the trial balance calculation is performed to help detect any errors that may have occurred in the closing process.

THE FOUR FINANCIAL STATEMENTS

Businesses report information in the form of financial statements issued on a periodic basis. GAAP requires the following four financial statements:

1. **Balance Sheet** - statement of financial position at a given point in time.
2. **Income Statement** - revenues minus expenses for a given time period ending at a specified date.
3. **Statement of Owner's Equity** - also known as Statement of Retained Earnings or Equity Statement.
4. **Statement of Cash Flows** - summarizes sources and uses of cash; indicates whether enough cash is available to carry on routine operations.

Balance Sheet

The balance sheet is based on the following fundamental accounting model:

Assets = Liabilities + Equity

Assets can be classed as either current assets or fixed assets. Current assets are assets that quickly and easily can be converted into cash, sometimes at a discount to the purchase price. Current assets include cash, accounts receivable, marketable securities, notes receivable, inventory, and prepaid assets such as prepaid insurance. Fixed assets include land, buildings, and equipment. Such assets are recorded at historical cost, which often is much lower than the market value.

Liabilities represent the portion of a firm's assets that are owed to creditors. Liabilities can be classed as short-term liabilities (current) and long-term (non-current) liabilities. Current liabilities include accounts payable, notes payable, interest payable, wages payable, and taxes payable. Long-term liabilities include mortgages payable and bonds payable. The portion of a mortgage long-term bond that is due within the next 12 months is classed as a current liability, and usually is referred to as the current portion of long-term debt. The creditors of a business are the primary claimants, getting paid before the owners should the business cease to exist.

Equity is referred to as owner's equity in a sole proprietorship or a partnership, and stockholders' equity or shareholders' equity in a corporation. The equity owners of a business are residual claimants, having a right to what remains only after the creditors have been paid. For a sole proprietorship or a partnership, the equity would be listed as the owner or owners' names followed by the word "capital". For example:

Sole Proprietorship: John Doe, Capital

Partnership: John Doe, Capital
Josephine Smith, Capital

In the case of a corporation, equity would be listed as common stock, preferred stock, and retained earnings.

The balance sheet reports the resources of the entity. It is useful when evaluating the ability of the company to meet its long-term obligations. Comparative balance sheets are the most useful; for example, for the years ending December 31, 2000 and December 31, 2001.

Income Statement

The income statement presents the results of the entity's operations during a period of time, such as one year. The simplest equation to describe income is:

Net Income = Revenue - Expenses

Revenue refers to inflows from the delivery or manufacture of a product or from the rendering of a service. Expenses are outflows incurred to produce revenue.

Income from operations can be separated from other forms of income. In this case, the income can be described by:

Net Income = Revenue - Expenses + Gains - Losses

where gains refer to items such as capital gains, and losses refer to capital losses, losses from natural disasters, etc.

Statement of Owners' Equity (Statement of Retained Earnings)

The equity statement explains the changes in retained earnings. Retained earnings appear on the balance sheet and most commonly are influenced by income and dividends. The Statement of Retained Earnings therefore uses information from the Income Statement and provides information to the Balance Sheet.

The following equation describes the equity statement for a sole proprietorship:

Ending Equity = Beginning Equity + Investments - Withdrawals + Income

For a corporation, substitute "Dividends Paid" for "Withdrawals". The stockholders' equity in a corporation is calculated as follows:

Common Stock (recorded at par value)
\+ Premium on Common Stock (issue price minus par value)
\+ Preferred Stock (recorded at par value)
\+ Premium on Preferred Stock (issue price minus par value)
\+ Retained Earnings

= Stockholders' Equity

Note that the premium on the issuance of stock is based on the price at which the corporation actually sold the stock on the market. Afterwards, market trading does not affect this part of the equity calculation. Stockholders' equity does not change when the stock price changes!

Cash Flow Statement

The nature of accrual accounting is such that a company may be profitable but nonetheless experience a shortfall in cash. The statement of cash flows is useful in evaluating a company's ability to pay its bills. For a given period, the cash flow statement provides the following information:

- Sources of cash
- Uses of cash
- Change in cash balance

The cash flow statement represents an analysis of all of the transactions of the business, reporting where the firm obtained its cash and what it did with it. It breaks the sources and uses of cash into the following categories:

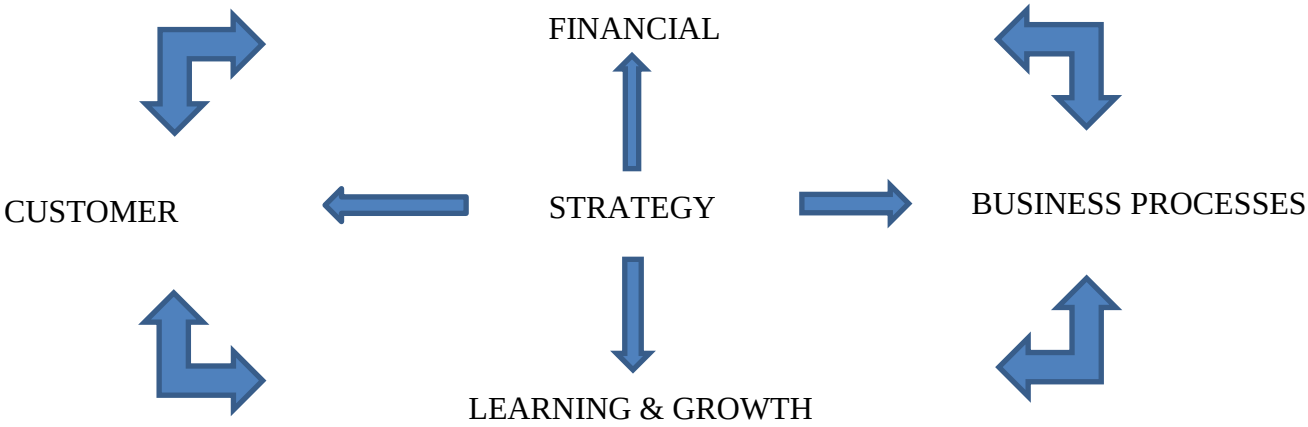
- Operating activities
- Investing activities
- Financing activities

The information used to construct the cash flow statement comes from the beginning and ending balance sheets for the period and from the income statement for the period.

THE BALANCED SCORECARD

Traditional financial reporting systems provide an indication of how a firm has performed in the past, but offer little information about how it might perform in the future. For example, a firm might reduce its level of customer service in order to boost current earnings, but then future earnings might be negatively impacted due to reduced customer satisfaction.

To deal with this problem, Robert Kaplan and David Norton developed the Balanced Scorecard, a performance measurement system that considers not only financial measures, but also customer, business process, and learning measures. The Balanced Scorecard framework is depicted in the following diagram:



The balanced scorecard translates the organization's strategy into four perspectives, with a balance between the following:

- between internal and external measures
- between objective measures and subjective measures
- between performance results and the drivers of future results

Beyond the Financial Perspective

In the industrial age, most of the assets of a firm were in property, plant, and equipment, and the financial accounting system performed an adequate job of valuing those assets. In the information age, much of the value of the firm is embedded in innovative processes, customer relationships, and human resources. The financial accounting system is not so good at valuing such assets.

The Balanced Scorecard goes beyond standard financial measures to include the following additional perspectives: the customer perspective, the internal process perspective, and the learning and growth perspective.

- Financial perspective - includes measures such as operating income, return on capital employed, and economic value added.
- Customer perspective - includes measures such as customer satisfaction, customer retention, and market share in target segments.
- Business process perspective - includes measures such as cost, throughput, and quality. These are for business processes such as procurement, production, and order fulfillment.
- Learning & growth perspective - includes measures such as employee satisfaction, employee retention, skill sets, etc.

These four realms are not simply a collection of independent perspectives. Rather, there is a logical connection between them - learning and growth lead to better business processes, which in turn lead to increased value to the customer, which finally leads to improved financial performance.

Objectives, Measures, Targets, and Initiatives

Each perspective of the Balanced Scorecard includes objectives, measures of those objectives, target values of those measures, and initiatives, defined as follows:

- Objectives - major objectives to be achieved, for example, profitable growth.
- Measures - the observable parameters that will be used to measure progress toward reaching the objective. For example, the objective of profitable growth might be measured by growth in net margin.
- Targets - the specific target values for the measures, for example, +2% growth in net margin.
- Initiatives - action programs to be initiated in order to meet the objective.

These can be organized for each perspective in a table as shown below.

Objectives	Measures	Targets	Initiatives
Financial			
Customer			
Process			
Learning			

Balanced Scorecard as a Strategic Management System

The Balanced Scorecard originally was conceived as an improved performance measurement system. However, it soon became evident that it could be used as a management system to implement strategy at all levels of the organization by facilitating the following functions:

1. Clarifying strategy - the translation of strategic objectives into quantifiable measures clarifies the management team's understanding of the strategy and helps to develop a coherent consensus.

2. Communicating strategic objectives - the Balanced Scorecard can serve to translate high level objectives into operational objectives and communicate the strategy effectively throughout the organization.

3. Planning, setting targets, and aligning strategic initiatives - ambitious but achievable targets are set for each perspective and initiatives are developed to align efforts to reach the targets.

4. Strategic feedback and learning - executives receive feedback on whether the strategy implementation is proceeding according to plan and on whether the strategy itself is successful ("double-loop learning").

These functions have made the Balanced Scorecard an effective management system for the implementation of strategy. The Balanced Scorecard has been applied successfully to private sector companies, non-profit organizations, and government agencies.

QUANTITATIVE METHODS:

CENTRAL TENDENCY

The term central tendency refers to the "middle" value or perhaps a typical value of the data, and is measured using the mean, median, or mode. Each of these measures is calculated differently, and the one that is best to use depends upon the situation.

Mean

The mean is the most commonly-used measure of central tendency. When we talk about an "average", we usually are referring to the mean. The mean is simply the sum of the values divided by the total number of items in the set. The result is referred to as the arithmetic mean. Sometimes it is useful to give more weighting to certain data points, in which case the result is called the weighted arithmetic mean.

The notation used to express the mean depends on whether we are talking about the population mean or the sample mean:

The population mean then is defined as:

$$\mu = \frac{\sum_{i=1}^{N} x_i}{N}$$

μ = population mean
Σ = summation sign
x_i = value of element i of the sample
N = population size

The mean is valid only for interval data or ratio data. Since it uses the values of all of the data points in the population or sample, the mean is influenced by outliers that may be at the extremes of the data set.

Median

The median is determined by sorting the data set from lowest to highest values and taking the data point in the middle of the sequence. There is an equal number of points above and below the median. For example, in the data set {1,2,3,4,5} the median is 3; there are two data points greater than this value and two data points less than this value. In this case, the median is equal to the mean. But consider the data set {1,2,3,4,10}. In this

dataset, the median still is three, but the mean is equal to 4. If there is an even number of data points in the set, then there is no single point at the middle and the median is calculated by taking the mean of the two middle points.

The median can be determined for ordinal data as well as interval and ratio data. Unlike the mean, the median is not influenced by outliers at the extremes of the data set. For this reason, the median often is used when there are a few extreme values that could greatly influence the mean and distort what might be considered typical. This often is the case with home prices and with income data for a group of people, which often is very skewed. For such data, the median often is reported instead of the mean. For example, in a group of people, if the salary of one person is 10 times the mean, the mean salary of the group will be higher because of the unusually large salary. In this case, the median may better represent the typical salary level of the group.

Mode

The mode is the most frequently occurring value in the data set. For example, in the data set {1,2,3,4,4}, the mode is equal to 4. A data set can have more than a single mode, in which case it is multimodal. In the data set {1,1,2,3,3} there are two modes: 1 and 3.

The mode can be very useful for dealing with categorical data. For example, if a sandwich shop sells 10 different types of sandwiches, the mode would represent the most popular sandwich. The mode also can be used with ordinal, interval, and ratio data. However, in interval and ratio scales, the data may be spread thinly with no data points having the same value. In such cases, the mode may not exist or may not be very meaningful.

When to use Mean, Median, and Mode

The following table summarizes the appropriate methods of determining the middle or typical value of a data set based on the measurement scale of the data.

MEASUREMENT SCALE	BEST MEASURE OF THE MIDDLE
Nominal (categorical)	Mode
Ordinal	Median
Interval	Symmetrical data: Mean Skewed data: Median
Ratio	Symmetrical data: Mean Skewed data: Median

DISPERSION

Without knowing something about how data is dispersed, measures of central tendency may be misleading. For example, a residential street with 20 homes on it having a mean value of $200,000 with little variation from the mean would be very different from a street with the same mean home value but with 3 homes having a value of $1 million and the other 17 clustered around $60,000. Measures of dispersion provide a more complete picture. Dispersion measures include the range, average deviation, variance, and standard deviation.

Range

The simplest measure of dispersion is the range. The range is calculated by simply taking the difference between the maximum and minimum values in the data set. However, the range only provides information about the maximum and minimum values and does not say anything about the values in between.

Average Deviation

Another method is to calculate the average difference between each data point and the mean value, and divide by the number of points to calcuate the average deviation (mean deviation). However, performing this calcuation will result in an average deviation of zero since the values above the mean will cancel the values below the mean. If this method is used, the absolute value of the difference is taken so that only positive values are obtained, and the result sometimes is called the mean absolute deviation. The average deviation is not very difficult to calculate, and it is intuitively appealing. However, the mathematics are very complex when using it in subsequent statistical analysis. Because of this complexity, the average deviation is not a very commonly used measure of dispersion.

Variance and Standard Deviation

A better way to measure dispersion is to square the differences before averaging them. This measure of dispersion is known as the variance, and the square root of the variance is known as the standard deviation. The standard deviation and variance are widely used measures of dispersion.

STANDARD DEVIATION AND VARIANCE

A commonly used measure of dispersion is the standard deviation, which is simply the square root of the variance. The variance of a data set is calculated by taking the arithmetic mean of the squared differences between each value and the mean value. Squaring the difference has at least three advantages:

1. Squaring makes each term positive so that values above the mean do not cancel values below the mean.

2. Squaring adds more weighting to the larger differences, and in many cases this extra weighting is appropriate since points further from the mean may be more significant.

3. The mathematics are relatively manageable when using this measure in subsequent statisitical calculations.

Because the differences are squared, the units of variance are not the same as the units of the data. Therefore, the standard deviation is reported as the square root of the variance and the units then correspond to those of the data set.

The calculation and notation of the variance and standard deviation depends on whether we are considering the entire population or a sample set. Following the general convention of using Greek characters to express population parameters and Arabic characters to express sample statistics, the notation for standard deviation and variance is as follows:

The population variance is defined as:

$$\sigma^2 = \sum (X_i - \bar{X})^2 / N$$

σ^2 = *variance*
X_i = *the value of the ith element*
$\bar{X}$ = *the mean of X*
N = *the number of elements*

The population standard deviation is the square root of this value.

The variance of a sampled subset of observations is calculated in a similar manner, using the appropriate notation for sample mean and number of observations. However, while the sample mean is an unbiased estimator of the population mean, the same is not true for the sample variance if it is calculated in the same manner as the population variance. If one took all possible samples of n members and calculated the sample variance of each combination using n in the denominator and averaged the results, the value would not be

equal to the true value of the population variance; that is, it would be biased. This bias can be corrected by using (n - 1) in the denominator instead of just n, in which case the sample variance becomes an unbiased estimator of the population variance.

This corrected sample variance is defined as:

$$s^2 = \frac{\sum_{i=1}^{n} (X_i - X_{avg})^2}{n-1}$$

The sample standard deviation is the square root of this value.

Standard deviation and variance are commonly used measures of dispersion. Additional measures include the range and average deviation.

PROBABILITY

Three Different Concepts of Probability

The classical interpretation of probability is a theoretical probability based on the physics of the experiment, but does not require the experiment to be performed. For example, we know that the probability of a balanced coin turning up heads is equal to 0.5 without ever performing trials of the experiment. Under the classical interpretation, the probability of an event is defined as the ratio of the number of outcomes favorable to the event divided by the total number of possible outcomes.

Sometimes a situation may be too complex to understand the physical nature of it well enough to calculate probabilities. However, by running a large number of trials and observing the outcomes, we can estimate the probability. This is the empirical probability based on long-run relative frequencies and is defined as the ratio of the number of observed outcomes favorable to the event divided by the total number of observed outcomes. The larger the number of trials, the more accurate the estimate of probability. If the system can be modeled by computer, then simulations can be performed in place of physical trials.

A manager frequently faces situations in which neither classical nor empirical probabilities are useful. For example, in a one-shot situation such as the launch of a unique product, the probability of success can neither be calculated nor estimated from repeated trials. However, the manager may make an educated guess of the probability. This subjective probability can be thought of as a person's degree of confidence that the event will occur. In absence of better information upon which to rely, subjective probability may be used to make logically consistent decisions, but the quality of those decisions depends on the accuracy of the subjective estimate.

Outcomes and Events

An event is a subset of all of the possible outcomes of an experiment. For example, if an experiment consists of flipping a coin two times, the possible outcomes are:

heads, heads
heads, tails
tails, heads
tails, tails

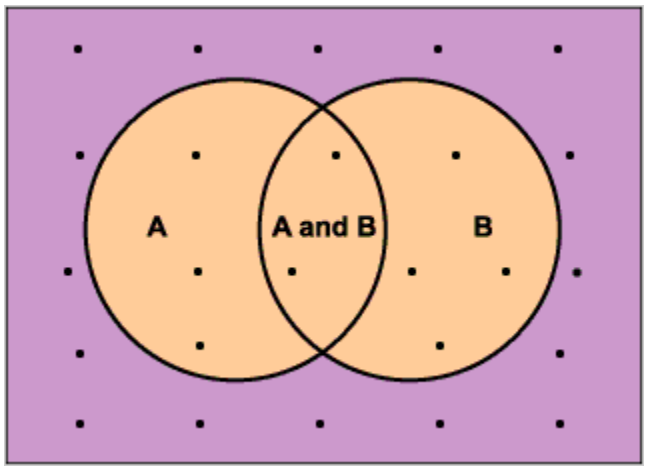
One can define the showing of heads at least one time to be an event, and this event would consist of three of the four possible outcomes.

Given that the probability of each outcome is known, the probability of an event can be determined by summing the probabilities of the individual outcomes associated with the event.

A composite event is an event defined by the union or intersection of two events. The union of two events is expressed by the "or" function. For example, the probability that either Event A or Event B (or both) will occur is expressed by P(A or B). The intersection of two events is the probability that both events will occur and is expressed by the "and" function. For exampe, the probability that both Event A and Event B will occur is expressed by P(A and B).

Law of Addition

Consider the following Venn diagram in which each of the 25 dots represents an outcome and each of the two circles represents an event.



In the above diagram, Event A is considered to have occurred if an experiment's outcome, represented by one of the dots, falls within the bounds of the left circle. Similarly, Event B is considered to have occurred if an experiment's outcome falls within the bounds of the right circle. If the outcome falls within the overlapping region of the two circles, then both Event A and Event B are considered to have occurred.

There are 5 outcomes that fall in the definition of Event A and 6 outcomes that fall in the definition of Event B. Assuming that each outcome represented by a dot occurs with equal probability, the probability if Event A is 5/25 or 1/5, and the probability of Event B is 6/25. The probability of Event A or Event B would be the total number of outcomes in the orange area divided by the total number of possible outcomes. The probability of Event A or Event B then is 9/25.

Note that this result is not simply the sum of the probabilities of each event, which would be equal to 11/25. Since there are two outcomes in the overlapping area, these outcomes are counted twice if we simply sum the probabilities of the two events. To prevent this double counting of the outcomes common to both events, we need to subtract the probability of those two outcomes so that they are counted only once. The result is the

law of addition, which states that the probability of Event A or Event B (or both) occurring is given by:

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

This addition rule is useful for determining the probability that at least one event will occur. Note that for mutually exclusive events there is no overlap of the two events so:

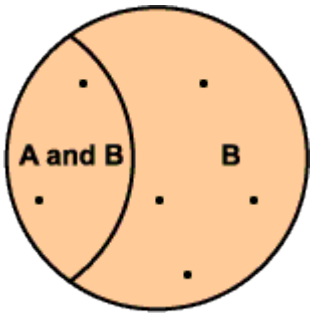
$$P(A \text{ and } B) = 0$$

and the law of addition reduces to:

$$P(A \text{ or } B) = P(A) + P(B)$$

Conditional Probability

Sometimes it is useful to know the probability that an event will occur given that another event occurred. Given two possible events, if we know that one event occurred we can apply this information in calculating the other event's probability. Consider the Venn diagram of the previous section with the two overlapping circles. If we know that Event B occurred, then the effective sample space is reduced to those outcomes associated with Event B, and the Venn diagram can be simplified as shown:



The probability that Event A also has occurred is the probability of Events A and B relative to the probability of Event B. Assuming equal probability outcomes, given two outcomes in the overlapping area and six outcomes in B, the probability that Event A occurred would be 2/6. More generally,

$$P(A \text{ given } B) = \frac{P(A \text{ and } B)}{P(B)}$$

Law of Multiplication

The probability of both events occurring can be calculated by rearranging the terms in the expression of conditional probability. Solving for P(A and B), we get:

$$P(A \text{ and } B) = P(A \text{ given } B) \times P(B)$$

For independent events, the probability of Event A is not affected by the occurance of Event B, so P(A given B) = P(A), and

$$P(A \text{ and } B) = P(A) \times P(B)$$

PERMUTATIONS AND COMBINATIONS

Certain types of probability calculations involve dividing the number of outcomes associated with an event by the total number of possible outcomes. For simple problems it is easy to count the outcomes, but in more complex situations manual counting can become laborious or impossible.

Fortunately, there are formulas for determining the number of ways in which members of a set can be arranged. Such arrangements are referred to as permutations or combinations, depending on whether the order in which the members are arranged is a distinguishing factor.

The number of different orders in which members of a group can be arranged for a group of r members taken r at a time is:

$$(r)(r-1)(r-2)...(1)$$

This is more easily expressed as simply r!.

When order is a distinguishing factor, a group of n members taken r at a time results in a number of permutations equal to the first r terms of the following multiplication:

$$(n)(n-1)(n-2)...$$

This can be expressed as:

$$nPr = n! / (n - r)!$$

In combinations, order is not a distinguishing factor:

$$nCr = nPr / (r!) = n! / (n - r)!r!$$

For the special case of possible pairs in a group of n members, assuming order in a pair is not important, then:

$$r = 2$$

and the number of possible pairs is:

$$n(n - 1) / 2.$$

Example: How many two-element subsets of {1,2,3,4} are there that do not contain the pair of elements 2 and 4 ?

Solution: 4! / (2!)(2!) = 6, but the subset {2,4} is not to be counted, so the answer is 5.

Given n items taken r at a time, to find the number of combinations in which x particular items are not present, simply reduce n by x and solve as one would a normal combination problem.

Combinations of Groups

If Group A has x members, Group B has y members, and Group C has z members, there are (x)(y)(z) possible combinations assuming that one member from each of the three groups is used in each combination, and assuming that the order is not a distinguishing factor. In general, if more than one member is taken at a time from each group, the number of combinations is the product of nCr (or nPr if appropriate) associated with each particular group.

MICROECONOMICS:

- Economic analysis
- Opportunity Cost
- Theory of Absolute Advantage
- Theory of Comparative Advantage

PRICE ELASTICITY OF DEMAND

The price elasticity of demand measures the responsiveness of quantity demanded to a change in price, with all other factors held constant.

Definition

The price elasticity of demand, E_d is defined as the magnitude of:

proportionate change in quantity demanded
---
proportionate change in price

Since the quantity demanded decreases when the price increases, this ratio is negative; however, the absolute value usually is taken and Ed is reported as a positive number. Because the calculation uses proportionate changes, the result is a unitless number and does not depend on the units in which the price and quantity are expressed.

As an example calculation, take the case in which a product's Ed is reported to be 0.5. Then, if the price were to increase by 10%, one would observe a decrease of approximately 5% in quantity demanded.

In the above example, we used the word "approximately" because the exact result depends on whether the initial point or the final point is used in the calculation. This matters because for a linear demand curve the price elasticity varies as one moves along the curve. For small changes in price and quantity the difference between the two results often is negligible, but for large changes the difference may be more significant. To deal with this issue, one can define the arc price elasticity of demand. The arc elasticity uses the average of the initial and final quantities and the average of the initial and final prices when calculating the proportionate change in each. Mathematically, the arc price elasticity of demand is defined as:

$$\frac{\frac{Q2 - Q1}{(Q1 + Q2)/2}}{\frac{P2 - P1}{(P1 + P2)/2}}$$

where

Q1 = Initial quantity
Q2 = Final quantity
P1 = Initial price
P2 = Final price

Elastic versus Inelastic

E > 1

In this case, the quantity demanded is relatively elastic, meaning that a price change will cause an even larger change in quantity demanded. The case of Ed = infinity is referred to as perfectly elastic. In this theoretical case, the demand curve would be horizontal. For products having a high price elasticity of demand, a price increase will result in a revenue decrease since the revenue lost from the resulting decrease in quantity sold is more than the revenue gained from the price increase.

E < 1

In this case, the quantity demanded is relatively inelastic, meaning that a price change will cause less of a change in quantity demanded. The case of Ed = 0 is referred to as perfectly inelastic. In this theoretical case, the demand curve would be vertical. For products whose quantity demanded is inelastic, a price increase will result in a revenue increase since the revenue lost by the relatively small decrease in quantity is less than the revenue gained from the higher price.

E = 1

In this case, the product is said to have unitary elasticity; small changes in price do not affect the total revenue.

Factors Affecting the Price Elasticity of Demand

- Availability of substitutes: the more possible substitutes, the greater the elasticity. Note that the number of substitutes depends on how broadly one defines the product.

- Degree of necessity or luxury: luxury products tend to have greater elasticity. Some products that initially have a low degree of necessity are habit forming and can become "necessities" to some consumers.
- Proportion of the purchaser's budget consumed by the item: products that consume a large portion of the purchaser's budget tend to have greater elasticity.
- Time period considered: elasticity tends to be greater over the long run because consumers have more time to adjust their behavoir.
- Permanent or temporary price change: a one-day sale will elicit a different response than a permanent price decrease.
- Price points: decreasing the price from $2.00 to $1.99 may elicit a greater response than decreasing it from $1.99 to $1.98.

GAME THEORY

Game theory analyzes strategic interactions in which the outcome of one's choices depends upon the choices of others. For a situation to be considered a game, there must be at least two rational players who take into account one another's actions when formulating their own strategies.

If one does not consider the actions of other players, then the problem becomes one of standard decision analysis, and one is likely to arrive at a strategy that is not optimal. For example, a company that reduces prices to increase sales and therefore increase profit may lose money if other players respond with price cuts. As another example, consider a risk averse company that makes its decisions by maximizing its minimum payoff (maxmin strategy) without considering the reactions of its opponents. In such a case, the minimum payoff might be one that would not have occurred anyway because the opponent might never find it optimal to implement a strategy that would make it come about. In many situations, it is crucial to consider the moves of one's opponent(s).

Game theory assumes that one has opponents who are adjusting their strategies according to what they believe everybody else is doing. The exact level of sophistication of the opponents should be part of one's strategy. If the opponent makes his/her decisions randomly, then one's strategy might be very different than it would be if the opponent is considering other's moves. To analyze such a game, one puts oneself in the other player's shoes, recognizing that the opponent, being clever, is doing the same. When this consideration of the other player's moves continues indefinitely, the result is an infinite regress. Game theory provides the tools to analyze such problems.

Game theory can be used to analyze a wide range of strategic interaction environments including oligopolies, sports, and politics. Many product failures can be attributed to the failure to consider adequately the responses of competitors. Game theory forces one to consider the range of a rival's responses.

Elements of a Game

- Players: The decision makers in the game.
- Actions: Choices available to a player.
- Information: Knowledge that a player has when making a decision.
- Strategies: Rules that tell a player which action to take at each point of the game.
- Outcomes: The results that unfold, such as a price war, world peace, etc.
- Payoffs: The utilities (or happiness) that each player realizes for a particular outcome.
- Equilibria: An equilibrium is a stable result. Equilibria are not necessarily good outcomes, a fact that is illustrated by the prisoner's dilemma.

Game Theory Framework

When evaluating a situation in which game theory is applicable, the following framework is useful.

1. Define the problem
2. Identify the critical factors. Examples of critical factors include differentiated products, first-mover advantage, entry and exit costs, variable costs, etc.
3. Build a model, such as a bimatrix game or an extensive form game.
4. Develop intuition by using the model
5. Formulate a strategy - cover all possible scenarios.

A good strategy could be used as a set of instructions for someone who knows nothing about the problem. It specifies the best action for each possible observation. The best strategy may be formulated by first evaluating the complete set of strategies. The complete set of strategies is a list of all possible actions for each possible observation.

Bimatrix Games

In a bimatrix game, there are two players who effectively make their moves simultaneously without knowing the other player's action. A bimatrix game can be represented by a matrix of rows and columns. Each cell in the matrix has a pair of numbers representing the payoff for the row player (the first number) and the column player (the second number). The game has the following form:

INSERT DIAGRAM

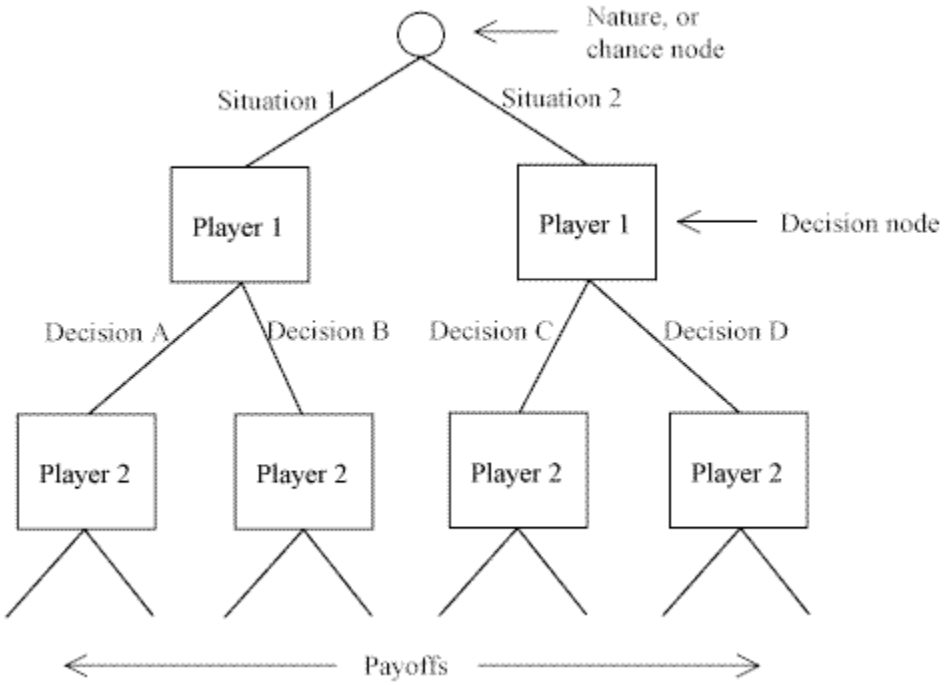
The general form of equilibrium in a bimatrix game is called a Nash Equilibrium. If both rivals have dominant strategies that coincide, then the equilibrium is called a dominant strategy equilibrium, a special case of a Nash equilibrium.

A dominant strategy, if it exists, is for one of the players the strategy that is always the best strategy regardless of what one's rival plays. A dominated strategy is one that is always the worst regardless of what one's rival plays. In games having more than two rows or problems, one may find it useful to identify one option that is always better or worse than another option, in other words, that dominates or is dominated by another option. In this case, the inferior strategy can be eliminated and the game simplified such that more options can be eliminated based on the smaller matrix.

If no options dominate any others, a Nash equilibrium might still be found by evaluating each player's best option for each option of the opponent. If a cell coincides for both players, then that cell is a Nash equilibrium. A game can have more than one Nash equilibrium, but one of them may be the more likely outcome if it is better for both players.

Extensive Form Games

Extensive form games are modeled with dots with arrows that point to other dots. A node is a decision point. The beginning point is depicted by an open dot, which usually represents a state from which a situation will arise by chance. Decision points are labeled with the name of the player making the decision. The following diagram shows the structure of an extensive-form game representation.



Structure of an Extensive Form Game

Chance nodes can appear anywhere in the extensive form tree.

An information set is a collection of nodes that are controlled by the same player, but which are indistinguishable for that player. In other words, for nodes in the same information set, the player does not know which one he/she is at, but does know that these nodes are different. In the preceding diagram, the drawn information sets might arise if Decision A and Decision C were indistinguishable to Player 2, as well as Decision B and Decision D. If a single dotted line encompassed all the Player 2 decision nodes (or 4 dotted circles all connected), then Player 2 would not be able to distinguish between any of the four decisions.

An extensive form game without information sets designated is one in which the players know exactly where they are in the tree. This situation is equivalent to one of dotted circles drawn around each decision point in the tree but not connected to one another. If neither player can observe anything about the other player's action, the sequential extensive form game can be reduced to the simultaneous-action bimatrix game.

Normal-Form (Strategic Form) Game Representation

The extensive form of representing a game can become difficult to manage as the game gets larger, and the Nash equilibria may become difficult to find. The extensive form representation can be collapsed into the normal form, which encodes the game into a strategy that describes the action to take for each conceivable situation (for example, for each information set). The normal form is a complete listing of all the possible strategies along with their payoffs. For a generic case in which there are three situations (information sets) based on Player 1's move, and two possible responses by Player 2, the normal form takes the following structure:

	Player 1			
	If Player 1			
does A, then	If Player 1			
does B, then	If Player 1			
does C, then	A	B	C	
Player 2	1)	d	d	d (__,__)(__,__)(__,__)
	2)	d	d	e (__,__)(__,__)(__,__)
	3)	d	e	d (__,__)(__,__)(__,__)
	4)	d	e	e (__,__)(__,__)(__,__)
	5)	e	d	d (__,__)(__,__)(__,__)
	6)	e	d	e (__,__)(__,__)(__,__)
	7)	e	e	d (__,__)(__,__)(__,__)
	8)	e	e	e (__,__)(__,__)(__,__)
	Payoffs			

Signaling and Threats

A signal is a commitment that changes the strategic situation. For example, if there exists danger of a price war, a smaller firm may sell a plant in order to reduce capacity and limit the amount of a larger firm's demand that it can steal, signaling that it does not intend to build substantial market share. As another example, a sports player who for some reason refuses to undergo an medical exam before negotiating his salary will raise doubts as to whether he has a medical condition that might affect his performance. This player might wish to signal that he does not have such a condition by proposing that his pay be tied to his performance. For a signal to be effective, its cost to a bluffer must exceed the benefits.

A threat is credible if it is believable. A threat is believable if it is in the best interest of the one making the threat to carry it out.

Auctions

Game theory can be used to analyze strategies for auctions. Auctions are useful mechanisms for price determination. Common auction formats include the English auction, Dutch auction, and sealed bid auction.

Legal Issues

One must consider that just because a possible action of one's opponent is illegal, this technicality might not prevent the action from being taken. For example, if a small but growing company's opponent is contemplating an illegal action, one should not rule out the possibility of that action without considering the cost of filing an anti-trust suit. The time and money required might not be the best thing for the development of the business. Even if the opponent is found guilty, the small company may be out of business by the time the suit is resolved. On the other hand, the publicity from such a lawsuit might be exactly what the smaller player needs to build brand awareness and win over new customers. (This is an example of exploitation of a big versus small asymmetry.)

Summary

Game theory helps one to develop optimal strategies. In an environment in which many outcomes are pre-determined when sophisticated players follow their best strategies, the way to improve one's payoff is to change the actual structure of the strategic interactions before the game is even played.

AUCTIONS

Auctions are mechanisms for determining prices. Auctions often are classified as one of the following auction types:

- First-price sealed-bid auction - winner pays his bid. In this case, one should bid below one's value an amount that depends on how many other bidders there are. The more bidders, the closer to one's value that one should bid. There is a tradeoff between profit and the frequency of winning.

- Second-price sealed-bid auction - winner pays highest losing bid. In this type of auction, the optimal strategy is to bid one's value.

- English auction - auctioneer begins with a low price. Bidders raise their bids until nobody is willing to bid higher. The optimal strategy in an English auction is to bid up to one's value, staying in the auction until the bids exceed one's value.

- Dutch auction - auctioneer calls out prices beginning with a very high value and gradually reduces it. The first bidder to accept an offered price wins. The Dutch auction gets its name because of its use in the flower markets in Holland. Note that eBay defines Dutch auctions differently. On eBay, a Dutch auction is one in which there are multiple units of the same item and all successful bidders pay a price equal to the lowest successful bid.

Auctions also may be characterized by whether the value is common (the same) to the bidders, for example, an oil lease, or by whether the value is private (different) to each bidder.

Single-round sealed-bid auctions can be analyzed as multiple-player, simultaneous choice games. In a sealed-bid auction, one has a tendency to win when one bids more than one's value. This phenomenon is known as the winner's curse. In an open-auction, the winner's curse is less pronounced because information from other bidders helps one to value it.

One's strategy depends on whether other bidders are simply bidding their value or are "shading" their bids. One can evaluate potential strategies using deviation logic. This involves asking oneself if one would utilize the strategy if everybody else were utilizing it.

MACROECONOMICS

GROSS DOMESTIC PRODUCT (GDP)

Economic growth is measured in terms of an increase in the size of a nation's economy. A broad measure of an economy's size is its output. The most widely-used measure of economic output is the Gross Domestic Product (abbreviated GDP).

GDP generally is defined as the market value of the goods and services produced by a country. One way to calculate a nation's GDP is to sum all expenditures in the country. This method is known as the expenditure approach and is described below.

Expenditure Approach to Calculating GDP

The expenditure approach calculates GDP by summing the four possible types of expenditures as follows:

GDP = Consumption
\+ Investment
\+ Government Purchases
\+ Net Exports

Consumption is the largest component of the GDP. In the U.S., the largest and most stable component of consumption is services. Consumption is calculated by adding durable and non-durable goods and services expenditures. It is unaffected by the estimated value of imported goods.

Investment includes investment in fixed assets and increases in inventory.

Government purchases are equal to the government expenditures less government transfer payments (welfare, unemployment payouts, etc.)

Net exports are exports minus imports. Imports are subtracted since GDP is defined as the output of the domestic economy.

Alternative Approaches to Calculating GDP

There are three approaches to calculating GDP:

- expenditure approach - described above; calculates the final spending on goods and services.
- product approach - calculates the market value of goods and services produced.
- income approach - sums the income received by all producers in the country.

These three approaches are equivalent, with each rendering the same result.

Final Sales as a GDP Predictor

Note that an increase in inventory will increase the GDP but possibly result in a lower future GDP as the excess inventory is depleted. To eliminate this effect, the final sales can be calculated by subtracting the increase in inventory from GDP. The final sales can be either larger or smaller than GDP. The change in inventory is an important signal of the next period's GDP.

Nominal GDP and Real GDP

Without any adjustment, the GDP calculation is distorted by inflation. This unadjusted GDP is known as the nominal GDP. In practice, GDP is adjusted by dividing the nominal GDP by a price deflator to arrive at the real GDP.

In an inflationary environment, the nominal GDP is greater than the real GDP. If the price deflator is not known, an implicit price deflator can be calculated by dividing the nominal GDP by the real GDP:

Implicit Price Deflator = Nominal GDP / Real GDP

The composition of this deflator is different from that of the consumer price index in that the GDP deflator includes government goods, investment goods, and exports rather than the traditional consumer-oriented basket of goods.

GDP usually is reported each quarter on a seasonally adjusted annualized basis.

GDP Growth

Countries seek to increase their GDP in order to increase their standard of living. Note that growth in GDP does not result in increased purchasing power if the growth is due to inflation or population increase. For purchasing power, it is the real, per capita GDP that is important.

While investment is an important factor in a nation's GDP growth, even more important is greater respect for laws and contracts.

GDP versus GNP

GDP measures the output of goods and services within the borders of the country. Gross National Product (GNP) measures the output of a nation's factors of production, regardless of whether the factors are located within the country's borders. For example, the output of workers located in another country would be included in the workers' home country GNP but not its GDP. The Gross National Product can be either larger or smaller

than the country's GDP depending on the number of its citizens working outside its borders and the number of other country's citizens working within its borders.

In the United States, the Gross National Product (GNP) was used until the early 1990's, when it was changed to GDP in order to be consistent with other nations.

CONSUMER PRICE INDEX (CPI)

The most commonly reported measure of the consumer price levels in the United States is the Consumer Price Index (CPI). Published by the U.S. Department of Labor 's Bureau of Labor Statistics, the CPI is a fixed-weight price index using a fixed basket of goods that are representative of what a typical consumer purchases each month.

There are many different CPI's calculated by region, types of products, types of consumers, etc. The most commonly reported CPI is the CPI-U, which is the CPI for all urban consumers.

Increases in the CPI level serve as a measure of the consumer inflation rate. The rate of inflation over a period of time is simply the percentage increase in the CPI over the period, often reported on an annualized basis.

Uses of the CPI

The CPI has many important uses, including the following:

- Economic indicator - the CPI is the most commonly reported measure of consumer prices.
- Reference for escalation agreements - labor contracts and other payment agreements that are indexed to inflation rely on the CPI.
- Deflator for economic series - when a series of data is to be adjusted so that it is reported in constant dollars, the CPI often is used as the deflator.

Because of the widespread use of the CPI, especially for adjusting payments to inflation, its accuracy can have a significant impact on the economy. In recent years, the accuracy of the CPI has been questioned due to a number of biases that cause it to overstate the effective rate of inflation.

CPI Biases

The CPI tends to overstate inflation because of the following biases:

- Substitution bias - when the price of a product in the consumer basket increases substantially, consumers tend to substitute lower-priced alternatives. For example, if a freeze in Florida causes the price of oranges to skyrocket, consumers may substitute Texas grapefruits for Florida oranges. Since the CPI is a fixed-weight price index, it would not accurately predict the impact of the price increase on the consumer's budget.
- Quality bias - over time, technological advances increase the life and usefulness of products. For example, the useful life of automobile tires increased substantially over the past few decades, decreasing the tire cost on a per mile basis, but the CPI does not reflect such improvements.

- New product bias - new products are not introduced into the index until they become commonplace, so the dramatic price decreases often associated with new technology products are not reflected in the index.
- Outlet bias - the consumer shift to new outlets such as wholesale clubs and online retailers is not well-represented by the CPI.

Some economists estimate that such biases overstate the CPI by about 1% per year.

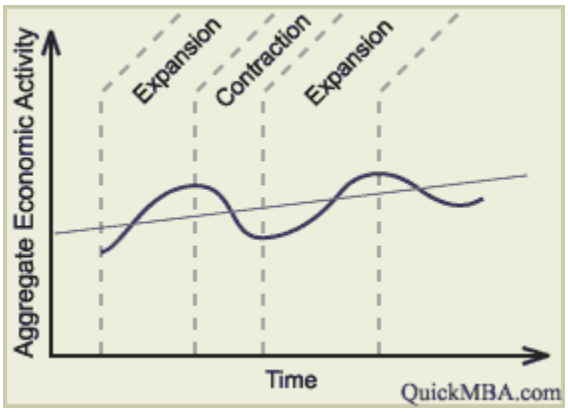
The U.S. Department of Labor has responded to these biases by more frequently changing the base period when the items in the index and their weights are adjusted. Also, the government now is quicker to add new products to the CPI basket and has made quality adjustments to the index.

THE BUSINESS CYCLE

Economic growth is not a steady phenomenon; rather, it tends to exhibit a pattern as follows:

1. an expansion of above-average growth
2. a peak
3. a contraction of below-average growth
4. a trough or low-point
5.

The troughs then are followed by periods of expansion and the cycle generally repeats, though not in a regular manner. These fluctuations in economic growth are known as the business cycle and are depicted conceptually in the following diagram:



The Business Cycle

Indicators of the Business Cycle

Because the business cycle is related to aggregate economic activity, a popular indicator of the business cycle in the U.S. is the Gross Domestic Product (GDP). The financial media generally considers two consecutive quarters of negative GDP growth to indicate a recession. Used as such, the GDP is a quick and simple indicator of economic contractions.

However, the National Bureau of Economic Research (NBER) weighs GDP relatively low as a primary business cycle indicator because GDP is subject to frequent revision and it is reported only on a quarterly basis (the business cycle is tracked on a monthly basis). The NBER relies primarily on indicators such as the following:

- employment
- personal income
- industrial production

Additionally, indicators such as manufacturing and trade sales are used as measures of economic activity.

Notable Business Cycle Expansions and Contractions

According to the National Bureau of Economic Research, the longest U.S. economic expansion on record began in March 1991 and lasted until March 2001, a duration of 10 years.

The longest economic contraction in the NBER databse was the 65 month contraction from October 1873 until March 1879. By comparison, the contraction that began in 1929 and that initiated the Great Depression lasted 43 months from August 1929 until March 1933.

Business Cycle Intensity Over Time

Many economists believe that the business cycle has become less pronounced, exhibiting briefer and shallower economic contractions. While there is economic data to support a diminished business cycle, other economists argue that the data prior to 1929 was not very accurate and tended to overstate the magnitude of the economic swings.

Whether the business cycle has become less intense has practical importance because after World War II the U.S. government initiated policies with the intent to minimize the severity of economic contractions, so a decrease in the intensity of the contractions would support the arguments of those who advocate such policies. Whether the business cycle really has declined in severity is a question that remains open to debate.

UNEMPLOYMENT

The percentage of the labor force that is seeking a job but does not have one is known as the unemployment rate. The unemployment rate is defined as follows:

$$\frac{\text{(Unemployed Workers)}}{\text{(Employed + Unemployed Workers)}} \times 100\%$$

Unemployed workers are those who are jobless, seeking a job, and ready to work if they find a job.

The sum of the employed and unemployed workers represent the total labor force. Note that the labor force does not include the jobless who are not seeking work, such as full-time students, homemakers, and retirees. They are considered to be outside the labor force.

The labor force participation rate is the percentage of the adult population that is part of the total labor force. All of these measures consider only persons 16 years of age or older.

The movement among the three groups can be illustrated as shown in the following diagram.

INSERT DIAGRAM

The diagram shows seven possible movements:

1. Employed to Employed - an employed person moves directly from one job to another job.
2. Employed to Unemployed - an employed person moves to unemployed status either as a job loser leaving against one's will or as a job quitter who leaves voluntarily with the intention to search for another job.
3. Employed to Not in the Labor Force - an employed person quits a job with no intention of immediately finding another job, for example, to return to school, to raise a family, or to retire.
4. Unemployed to Employed - an unemployed person finds and accepts a job.
5. Unemployed to Not in the Labor Force - an unemployed person ends the job search and leaves the labor force, often because of lack of success in finding a job after an extended period of time (discouraged workers).
6. Not in the Labor Force to Unemployed - a person who is not in the labor force begins a job search, for example, a student who seeks a job after graduation.
7. Not in the Labor Force to Employed - a person not in the labor force moves directly into a job, for example, a student with a job waiting upon graduation.

From this model, we see that a worker may end up in the grouping of "unemployed" from one of two possible paths: 1) by job separation, either as a job loser or a job quitter, and 2) by moving into the labor force, either as a new entrant or as a re-entrant.

Full Employment and the Natural Rate of Unemployment

It commonly has been the goal of policy makers to use monetary policy to achieve the goal of full employment in the economy. Over the years, several different definitions have been proposed for full employment, but such a definition is complicated by the fact that the economy always has some unemployment, even during economic expansions. This non-zero rate of unemployment is due to:

- Frictional unemployment - caused by the fact that it takes time for employers and workers to find an appropriate match. For example, job seekers tend to spend time to find the best possible job rather than take the first one available, and employers take the time to interview several candidates to find the best fit. Unemployment insurance increases frictional unemployment by decreasing the opportunity cost of unemployment, thereby increasing the lowest wage that the job seeker would be willing to accept and lengthening the job search.
- Structural unemployment - refers to unemployment caused by a mismatch between workers and jobs. This mismatch may be in geographical location or in skills. For example, technological change may have caused a worker's skills to become obsolete, and he or she may experience a period of unemployment before finding the opportunity to develop new skills and to adapt. The resulting surplus of labor (quantity supplied is greater than quantity demanded) is influenced by minimum wage laws, collective bargaining, and efficiency wages, all of which create higher wages that attract more people into the labor force while decreasing the demand for labor.

Since zero unemployment is unachievable in a free labor market, Milton Friedman used the term natural rate of unemployment to describe the baseline rate of unemployment, considering that some unemployment cannot be avoided. The natural rate of unemployment is the sum of the frictional and structural unemployment rates. It does not include cyclical unemployment that results from a downturn in the business cycle.

When the unemployment rate falls below its natural rate, there is upward pressure on wages, and the economy runs the risk of inflation. Rather than a simple trade-off between the rate of inflation and the rate of unemployment, under the natural rate hypothesis once the rate went below the natural rate, inflation would accelerate. The natural rate of unemployment became known as the non-accelerating inflation rate of unemployment (NAIRU).

The natural rate of unemployment changes over time. In the U.S., some mainstream economists have placed the natural rate of unemployment in the 5% to 6% range, though other economists have placed it as low as 4% and as high as 7% over the past several

decades. This variability and lack of precision in the natural rate of unemployment represent a source of uncertainty with which policy makers must deal.

Public policy itself has an impact on the natural rate of unemployment. With regard to frictional unemployment and labor surplus we see at least two levers controlled by public policy: 1) unemployment insurance, and 2) minimum wage laws. As discussed above, both of these tend to increase the natural rate of unemployment, and there is a trade-off between the benefits of such labor policies and an increased natural rate of unemployment.

Seasonal Variations

The number of job seekers changes over the course of the year due to seasonal effects. For example, weather patterns, harvests, tourist seasons, school and university calendars, and holidays all influence unemployment numbers. If left unadjusted, such changes make it difficult to compare unemployment figures from one month to the next.

To address seasonal variations, the U.S. Bureau of Labor Statistics adjusts the monthly unemployment rate numbers based on a statistical analysis of previous years. The result is that the reported unemployment rate more accurately reflects the underlying state of the economy.

Duration of Unemployment

In addition to the unemployment rate itself, the average length of time that a person remains unemployed also is of interest. The severity of the impact of unemployment depends in part on how quickly and easily an unemployed person can find work. For example, teenagers have an unemployment rate that is much higher than average, but also find jobs quicker and therefore have a lower duration of unemployment. Statistics reported by the U.S. Department of Labor indicate that since 1948, the average duration of unemployment in the U.S. ranged from a low of approximately 7 weeks to a high of approximately 20 weeks.

Statistics such as the number of workers unemployed for more than half a year provide additional information about the unemployment situation.

Limitations of the Unemployment Rate Measurement

The unemployment rate is not a perfect indicator of employment in the economy. The following are some reasons:

- Discouraged workers - those who want a job but have given up looking and therefore do not fall within the definition of the labor force. These persons tend to make the reported unemployment rate lower than it otherwise would be.
- Collecting benefits but not job seeking - while a state unemployment office may require a person to actively seek a job in order to collect unemployment insurance

benefits, some benefit recipients do not really want a job and do not put much effort into the job search. Due to this effect, the reported unemployment rate is higher than it otherwise might be.
- Underemployed - a person is counted as employed if he or she is working part-time; however, that person nonetheless may be seeking full-time work.

Discouraged workers and ones collecting unemployment benefits without seeking a job make it difficult to distinguish between those who are unemployed and those who are not in the labor force. These effects work in mixed directions; unemployment may be overstated or understated by the unemployment rate. As long as any bias in the unemployment rate is relatively constant over time, then the rate is still useful for measuring changes in the economy from one period to the next.

Other indicators such as the number of discouraged workers and part-time labor statistics all can supplement the unemployment rate data to provide additional insight.

Impact of Unemployment

Unemployment presents problems for both the individual and for the economy as a whole.

- Individual hardship (financial and psychological) can arise when a person needs a job and cannot find one. The individual's economic hardship is mitigated somewhat by unemployment insurance benefits.
- Aggregate economic output is less than the potential GDP level due to loss of production from those who are unemployed.

COST ACCOUNTING:

- Determination of cost of item, based on activity
- Aligning Strategy of the company with the Activities it engages in
- Value Chain Analysis
- SWOT analysis
    - Internal Env – Strengths and Weaknesses
    - External Env – Opportunities and Threats
    - Attempt to merge these with your core competentices to develop an area in which you can compete and develop a profitable strategy.

PRODUCTION MANAGEMENT

- Process Management
- Front End versus Back End operations

SUPPLY CHAIN MANAGEMENT

A supply chain is a network that includes vendors of raw materials, plants that transform those materials into useful products, and distribution centers to get those products to customers.

Without any specific effort to coordinate the overall supply chain system, each organization in the network has its own agenda and operates independently from the others. However, such an unmanaged network results in inefficiencies. For example, a plant may have the goal of maximizing throughput in order to lower unit costs. If the end demand seen by the distribution system does not consume this throughput, there will be an accumulation of inventory. Clearly, there is much to be gained by managing the supply chain network to improve its performance and efficiency.

Decision Variables in Supply Chain Management

In managing the supply chain, the following are decision variables:

- Location - of facilities and sourcing points
- Production - what to produce in which facilities
- Inventory - how much to order, when to order, safety stocks
- Transportation - mode of transport, shipment size, routing, and scheduling

The Bullwhip Effect

A problem frequently observed in unmanaged supply chains is the bullwhip effect. This effect is an oscillation in the supply chain caused by demand variability. This problem must be addressed in order to avoid the poorer service and higher costs that stem from it.

Inventory Management

Variation in demand increases the challenge of maintaining inventory to avoid stockouts. There exist techniques for inventory management that optimize the performance for a given set of parameters.

Vendor Managed Inventory

An effective way to improve supply chain performance is for the vendor to determine the quantities that should be ordered by its downstream customers, rather than the other way

around. This approach is known as Vendor Managed Inventory, abbreviated VMI. While its implementation faces practical challenges, it can be an effective method for reducing inventory and stock-outs.

Accurate Response

In the classical news vendor problem, one must decide the best order quantity that maximizes profits given that some money is lost if all of the units do not sell and given the fact that potential profits are lost if the units sell out. In some situations, a second order can be placed once the sales period begins. Such an opportunity helps one to better match supply and demand, since the first order can be a quantity equal to the expected demand minus a selected number of standard deviations (2, for example) below that mean. Of course, any minimum order quantities must be taken into account.

In many industries, the variance in demand is proportional to the variance in the forecasts for that demand. This relationship even exists in stock price forecasting. When this relationship holds, it can be used to estimate the mean demand and its variance, and these values can be used in optimization models.

For seasonal goods such as winter sportswear, which has a short selling season and long lead times, a firm can do several things to better match supply and demand:

- Additional events can be held before large trade fairs in order to secure orders further in advance.
- Supplier capacity can be reserved without specifying the exact product mix. This postponement of the final mix has benefits similar to those of postponing product customization until the distribution center.
- Common parts can be used in designs in order to pool some of the variation between individual demands.

Supply Chain Structure

The performance of a supply chain is measured in terms of profit, average product fill rate, response time, and capacity utilization.

Profit projections may improve if another parameter is relaxed, but one must consider the impact of all aspects of the relaxed parameter on profits. For example, if customers are lost because response time is too slow, then the profit projections may be artificially high.

Average fill rate can be improved by carrying more inventory in order to reduce stock-outs. The optimal balance must be achieved between inventory cost and lost profits due to stock-outs.

Response time often can be improved at the expense of higher overall costs. As with fill rate, the optimal trade-off should be found. If response time is sacrificed in order to

achieve higher profits, sales forecasts may have to be modified if the elasticity of demand with respect to service is significant at the chosen service levels.

Capacity utilization should be high enough to reduce overhead sufficiently, but not so high that there is no room to grow or to handle fluctuations in demand. Problems often are encountered when capacity utilization exceeds 85%. Lower capacity utilization in effect buys an option for increased output in the future. Higher capacity utilization decreases downside risk since costs are reduced, but also limits the upside gain if future demand should outstrip supply.

Make-To-Order

To reduce inventory and increase flexibility, some firms have turned to make-to-order production systems. Some companies can reap great benefit from such a system. Make-to-stock is better for other companies, such as those whose customers are not willing to wait for the product.

THE BULLWHIP EFFECT

An unmanaged supply chain is not inherently stable. Demand variability increases as one moves up the supply chain away from the retail customer, and small changes in consumer demand can result in large variations in orders placed upstream. Eventually, the network can oscillate in very large swings as each organization in the supply chain seeks to solve the problem from its own perspective. This phenomenon is known as the bullwhip effect and has been observed across most industries, resulting in increased cost and poorer service.

Causes of the Bullwhip Effect

Sources of variability can be demand variability, quality problems, strikes, plant fires, etc. Variability coupled with time delays in the transmission of information up the supply chain and time delays in manufacturing and shipping goods down the supply chain create the bullwhip effect. The following all can contribute to the bullwhip effect:

- Overreaction to backlogs
- Neglecting to order in an attempt to reduce inventory
- No communication up and down the supply chain
- No coordination up and down the supply chain
- Delay times for information and material flow
- Order batching - larger orders result in more variance. Order batching occurs in an effort to reduce ordering costs, to take advantage of transportation economics such as full truck load economies, and to benefit from sales incentives. Promotions often result in forward buying to benefit more from the lower prices.
- Shortage gaming: customers order more than they need during a period of short supply, hoping that the partial shipments they receive will be sufficient.
- Demand forecast inaccuracies: everybody in the chain adds a certain percentage to the demand estimates. The result is no visibility of true customer demand.
- Free return policies

Countermeasures to the Bullwhip Effect

While the bullwhip effect is a common problem, many leading companies have been able to apply countermeasures to overcome it. Here are some of these solutions:

- Countermeasures to order batching - High order cost is countered with Electronic Data Interchange (EDI) and computer aided ordering (CAO). Full truck load economics are countered with third-party logistics and assorted truckloads. Random or correlated ordering is countered with regular delivery appointments. More frequent ordering results in smaller orders and smaller variance. However, when an entity orders more often, it will not see a reduction in its own demand variance - the reduction is seen by the upstream entities. Also, when an entity

orders more frequently, its required safety stock may increase or decrease; see the standard loss function in the Inventory Management section.

- Countermeasures to shortage gaming - Proportional rationing schemes are countered by allocating units based on past sales. Ignorance of supply chain conditions can be addressed by sharing capacity and supply information. Unrestricted ordering capability can be addressed by reducing the order size flexibility and implementing capacity reservations. For example, one can reserve a fixed quantity for a given year and specify the quantity of each order shortly before it is needed, as long as the sum of the order quantities equals to the reserved quantity.
- Countermeasures to fluctuating prices - High-low pricing can be replaced with every day low prices (EDLP). Special purchase contracts can be implemented in order to specify ordering at regular intervals to better synchronize delivery and purchase.
- Countermeasures to demand forecast inaccuracies - Lack of demand visibility can be addressed by providing access to point of sale (POS) data. Single control of replenishment or Vendor Managed Inventory (VMI) can overcome exaggerated demand forecasts. Long lead times should be reduced where economically advantageous.
- Free return policies are not addressed easily. Often, such policies simply must be prohibited or limited.

INVENTORY MANAGEMENT

To minimize supply and demand imbalances in the supply chain, firms utilize various methods of inventory management. The problem is complicated by the fact that demand is uncertain, and this uncertainty can cause stockouts in which inventory is depleted and orders cannot be filled.

Here, we discuss a model in which the inventory level is reviewed periodically, and orders are placed at regular intervals to order up to a certain base stock. This policy is known as a Policy of Periodic Review, Order-Up-To Base Stock.

Under this policy, one orders a variable quantity Q every fixed period of time p in order to maintain an inventory position (Qty on hand + Qty on order) at a predefined base stock level S, also known as the "order-up-to level." The base stock level S is determined by calculating the quantity needed between the time the order is placed and the time that the next period's order is received, and adding a quantity of safety stock to allow for variation in the demand.

The time between the placing of the order and the receiving of the next period's order is the sum of the review period p and the replenishment lead time l (lower-case L). The demand per unit of time, μ, is multiplied by the time between order placement and the next period's order arrival ($p + l$) to determine the expected quantity to be sold. The safety stock depends upon the variability in the demand and the desired order fill rate.

To calculate the safety stock, first calculate the standard loss function, designated as L(z). This function is dependent on the values of the desired fill rate f, the demand μ and its standard deviation σ, the time between orders p, and the replenishment lead time l :

$$L(z) = (1 - f) \mu p / \sigma (p + l)1/2$$

Once L(z) is known, z can be found in a look-up table and the safety stock can be calculated by:

$$\text{Safety Stock} = z \sigma (p + l)1/2$$

If the review period p is reduced, the safety stock does not necessarily reduce because p is in both the numerator and denominator of the standard loss function which determines the value of z.

The average level of on-hand inventory is the sum of the cycle stock (equal to $\mu p/2$) and the safety stock. The on-hand inventory does not include those units in the delivery pipeline.

This model can be complicated by the following real-world issues: variable lead times, non-stationary demand, multiple inventory sites, multiple customer classes, and multi-item order fill rate.

When several components are needed to build a system, each component having the same fill rate, the overall system order fill rate (multi-item fill rate) will be lower than the component fill rate since an order cannot be completed even if only a single component is missing. The multi-item fill rate is the product of the individual item fill rates. For n items having the same component fill rate:

$$\text{order fill rate} = (\text{component fill rate})n$$

When there are long shipping times, the idea of postponing the last stages of final assembly until the product reaches the distribution center (DC) may become attractive. At the DC, the units can be localized and customized according to the demand patterns seen at that time. The result is that the total safety stock required at the DC is reduced by a factor of n1/2, where n is the number of different SKU's for which the customization is being postponed.

To maximize the benefits of postponement, the product should be designed to be distribution center localizable. The variable features of the product can be isolated into one or two modules that are to be installed in the distribution center.

VENDOR MANAGED INVENTORY

Some firms have successfully improved their supply chain performance by implementing an approach known as Vendor Managed Inventory (VMI). With VMI, the vendor specifies delivery quantities sent to customers through the distribution channel using data obtained from EDI. Vendor Managed Inventory, Just-in-Time Distribution (JITD), and Efficient Consumer Response (ECR) all refer to similar concepts, but applied to different industries. For example, the grocery and apparel industries tend to use ECR, whereas the automobile industry tends to use VMI and JITD.

The Vendor Managed Inventory Approach

VMI reduces stock-outs and reduces inventory in the supply chain. Some features of VMI include:

- Shortening of the supply chain
- Centralized forecasting
- Frequent communication of inventory, stock-outs, and planned promotions. Electronic Data Interchange (EDI) linkages facilitate this communication.
- No manufacturer promotions
- Trucks are filled in a prioritized order. For example, items that are expected to stock out have top priority, then items that are furthest below targeted stock levels, then advance shipments of promotional items (promotions allowed only in transition phase), and finally, items that are least above targeted stock levels.
- Relationship with downstream distribution channels
- Result: Inventory reduction and stock-out reduction

VMI Implementation Challenges

VMI can be made to work, but the problem is not just one of logistics. VMI often encounters resistance from the sales force and distributors. At issue are roles and skills, trust, and power shifts. Some of the sales force concerns are:

- Loss of control
- Effect on compensation - incentive bonuses may depend on how much is sold, but sales force has less influence under VMI.
- Possible loss of job
- Skepticism that it will function well - technical problems
- Concern that reduced inventory will result in less shelf space and therefore loss of market share. This concern can be addressed by filling the shelf space with other stock keeping units from the same vendor.

Distributors also may have concerns about vendor managed inventory, including:

- Inventory will be pushed on them
- No more promotions, discounts, and forward buying
- With less inventory, more risk of disruptions due to strikes, adverse weather, etc.
- The vendor enjoys the benefits while the distributor gives up its only lever of power - data on what the retailers want.
- Danger of being replaced - vendor may decide to forward integrate.

Addressing Concerns

For a VMI system to work, the concerns of distributors and the sales force must be addressed. They can be at least partially addressed by the following:

- Transform the sales role into one of marketing. For example, bonuses can be given based on the number of new clients.
- Distributor skepticism can be addressed by implementing a pilot program with vendor-owned warehouses in order to demonstrate that the system works. Introduce system in distributor-owned warehouses on a pilot basis.
- Engage a neutral consultant in meetings among the vendor, distributor, and sales force.
- Allow some manufacturer promotions in the transition.
- Extensively simulate the system off-line before implementing.
- Don't exaggerate the benefits of VMI; otherwise, any delay in realizing the benefits may cause the supply chain to lose faith in the system.

MAKE TO ORDER

Traditional production systems produce products and stock them as inventory until they are sold (make-to-stock). In order to reduce inventory and increase the level of customization, some firms have designed their production systems to produce a product only after it is ordered. Such systems are referred to as make-to-order.

Make-to-order systems are not appropriate for all types of products, and the make-to-order versus make-to-buy decision must be weighed carefully. The following are some factors to consider when evaluating the prospect of make-to-order:

- Value of a custom product: Are customers willing to pay more for customization?
- Customer patience: Are customers willing to wait for a custom product to be manufactured and delivered? If not, the cost of losing the customer to the competition is the margin on the product, plus the value of any future purchases that may be lost as a result of the customer's switching to the competition. Even if the customer switches to another model from the same firm, a loss of goodwill may result.
- Cost of stockouts: Assuming the customer is patient enough to wait the specified delivery time, make-to-order eliminates the problem of stock-outs. If stock-outs are estimated to have a relatively large cost associated with them, make-to-order becomes more attractive.
- Inventory holding costs: Does the product lose its value quickly? Is it easily damaged? Do customers demand a high level of variety (and therefore higher inventory costs)? Make-to-order becomes more attractive as inventory holding cost increases.
- Modularity: If the product is modular, component inventory costs can be reduced since less safety stock is required.
- Manufacturing lead time: A long lead time may render a make-to-order system infeasible if the customers are not willing to wait.
- Manufacturing set-up costs: If set-up costs are high, make-to-order might incur too large a cost penalty relative to the benefits of customization. Automated flexible manufacturing systems help to reduce set-up costs.

QUALITY AND PRODUCTIVITY

Introduction

All businesses have process flows in which a product is designed or manufactured or in which a service is rendered. An on-going goal is to achieve the maximum possible throughput at the lowest possible cost while meeting all the requirements of the product or service.

Inventory Benefits

A certain minimum amount of in-process inventory is always necessary. This level is defined by Little's Law:

$I = R \times T$

where I = inventory, R = flow rate, and T = flow time, all of which are average values.

The actual amount of inventory in the process will be greater than the theoretical amount because some inventory always will be in-transit between different locations. Furthermore, the actual levels usually are planned to be even higher.

There are four possible reasons that firms intentionally plan excess inventory levels:

1. Economies of scale
   - Quantity discounts offered by suppliers.
   - Fixed ordering costs and fixed setup costs are lower if spread across more units.

2. Production and capacity smoothing
   - Rather than vary processing rate to match varying demand, it may be more economical to process at a constant rate and use inventory as a buffer.

3. Protection against supply disruptions and demand surges
   - Supply disruptions may result in process starvation, downtime, and throughput reduction.
   - Demand surges can result in delayed deliveries, lost sales, and customer dissatisfaction.

4. Profiting from price changes
   - Speculative inventories can be used to protect and profit from sudden price changes.
   - Inflows and outflows can be managed in order to optimize the financial value of the inventory.

Inventory Costs (Disadvantages of a large inventory)

- Increased response time to changes in market demand.
- Increased time to change to new products.
- Delay in detection of quality problems
- Decouples stages of the process flow, discouraging teamwork
- Holding costs (physical holding cost and cost of capital)
- Physical holding costs include operating costs and losses due to spoilage, obsolescence, pilferage, etc. Expressed as a fraction h of the variable cost C of one flow unit of inventory. So the physical holding cost for one unit of inventory for one time period is equal to h x C.
- Cost of capital is the opportunity cost of foregone returns on the amount invested in inventory that could have been invested in other projects. Cost of capital per flow unit is expressed as r x C where r is the cost of capital and C is the variable cost of one flow unit.
- Total holding cost is: H = (h + r) x C.

When counting average inventory in a process, the steps prior to the process bottleneck will be full, and those afterwards will be occupied by a ratio of the throughput rate of those steps to that of the bottleneck.

Conveyor Belts

When changing a production system from a long conveyor belt to a production cell system, with each cell producing the full product with fewer workers, one method to determine the optimal place to break the line is:

1. Add the total labor time and divide by the number of workers in a cell.
2. Add the tasks for the first worker's steps until this average time is exceeded.
3. Drop the last task and determine if the resulting average for the remaining workers is greater than or less than that for the first with that time included.

Inventory in Queue with Variable Arrival

$$II = [\rho \times \rho sqrt(2(c+1)) - 1 / 1 - \rho] \times (Ci2 + Cp2) / 2$$

where II = inventory
ρ = capacity utilization

C = std. dev / mean

When calculating average wait time, divide average inventory in the queue by the arrival rate, not by the processing rate. This is because the system throughput is determined by the incoming rate, not the processing rate (capacity utilization < 1).

Some Quality Experts

Deming: statistical process control
Juran: modeled cost of quality as U-shaped curve
Crosby: quality is free

Glossary

Process Capacity equals maximum flow rate in units per time period.

LINEAR PROGRAMMING TOPICS

Linear programming is a quantitative analysis technique for optimizing an objective function given a set of constraints. As the name implies, the functions must be linear in order for linear programming techniques to be used.

Problem Formulation Checklist

The objective function and constraints are formulated from information extracted from the problem statement. The following checklist is useful for minimizing the risk of errors in problem formulation.

1. Every number in problem statement should be either implemented in the formulation or rejected as irrelevant, e.g. sunk costs.
2. Don't forget any initial conditions, e.g. initial staff on hand at beginning of first staffing period.
3. Ensure every variable in the objective function is listed somewhere in the constraints.
4. Ensure that any non-negativity constraints are listed.
5. Ensure that binary integer variables are restricted to 0,1.
6. For example, $Y \in \{0,1\}$
7. For good form, move all variables to left hand side of equation, writing them in the order of their subscripts.

Sensitivity Analysis

While problems may be modeled using deterministic objective functions, in the real world there is variation. A sensitivity analysis can be performed to determine the sensitivity of the solution to changes in parameters.

Microsoft Excel can generates a sensitivity report in two parts - a changing cells report and a constraints report.

Changing Cells (Adjustable Cells)

Cell	Name	Final Value	Reduced Cost	Objective Coefficient	Allowable Increase	Allowable Decrease

For the Changing Cells report, the allowable increase and decrease refers to how much the objective function decision variable coefficient can change without changing the values of any of the decision variables. However, the objective function value will have to change if a coefficient changes and the corresponding decision variable does not change. Note though, that multiplying each term in the objective function by a constant does not change the values of the decision variables.

The 100% rule can be used to determine if a change in multiple objective function coefficients will change the values of the decision variables. Under this rule, any

combination of changes can occur without a change in the solution as long as the total percentage deviation from the coordinate extremes does not exceed 100%. However, the objective value would change since the objective coefficients are changing.

For the purpose of this analysis, the decision variable coefficient is the effective number that is multiplied by the decision variable when the objective function is simplified so that each decision variable appears once.

Reduced Cost is how much more attractive the variable's coefficient in the objective function must be before the variable is worth using. Ignore the sign reported by Excel.

Constraints	Cell	Name	Final Value	Shadow Price	Constraint R.H. Side	Allowable Increase	Allowable Decrease

The shadow price is the amount that the objective function value would change if the named constraint changed by one unit. The shadow price is valid up to the allowable increase or decrease in the constraint. The shadow price after the constraint is changed by the entire allowable amount is unknown, but is always less favorable than the reported value due to the law of diminishing returns.

To determine if a constraint is binding, compare the Final Value with the Constraint R.H. Side. If a constraint is non-binding, its shadow price is zero.

Linearity from Non-Linear Problems

Many problems that initially may be non-linear may be made linear by careful formulation. For example, one can avoid using the inequality ≠. For binary integer variables, $X + Y \neq 1$ is the same as saying $X = Y$.

Binary Variables

When relating continuous decision variables to binary switch variables, the following form often is useful:

continuous variable expression < (some large number) (binary variable)

Simulation

Linear programming techniques assume certainty and by themselves do not deal well with significant randomness. The following is one possible procedure for maximizing or minimizing some objective function that contains random variables.

1. Express the objective function in terms of the decision variable.
2. Define a search range and incremental search value for the decision variable, possibly using problem information to reduce the search range.

3. Run a simulation for each incremental value of the decision variable using a Monte Carlo simulator such as Crystal Ball.
4. Compare the mean expected values of the objective function and their confidence intervals, possibly using statistical hypothesis testing to identify the best solution.

Confidence Intervals
95% confidence intervals: +/- 1.96 sigma

90% confidence intervals: +/- 1.645 sigma

Useful Functions

MIN(x,y) or MAX(x,y)

x,y can be any variable (possibly a random variable), expression, or number.

Applications include revenue calculations that might be limited by either demand or production quantity.

~N(μ = x, σ = y)

normal distribution with mean x, std dev. y; directly to right of random variable

~U[x,y]

uniform distribution with min x, max y; directly to right of random variable

CORPORATE FINANCE:

- Growth means more investment is needed, what is the NPV of that growth, at what cost???

CORPORATE FINANCE

Arguably, the role of a corporation's management is to increase the value of the firm to its shareholders while observing applicable laws and responsibilities. Corporate finance deals with the strategic financial issues associated with achieving this goal, such as how the corporation should raise and manage its capital, what investments the firm should make, what portion of profits should be returned to shareholders in the form of dividends, and whether it makes sense to merge with or acquire another firm.

Balance Sheet Approach to Valuation

If the role of management is to increase the shareholder value, then managers can make better decisions if they can predict the impact of those decisions on the firm's value. By observing the difference in the firm's equity value at different points in time, one can better evaluate the effectiveness of financial decisions. A rudimentary way of valuing the equity of a company is simply to take its balance sheet and subtract liabilities from assets to arrive at the equity value. However, this book value has little resemblance to the real value of the company. First, the assets are recorded at historical costs, which may be much greater than or much less their present market values. Second, assets such as patents, trademarks, loyal customers, and talented managers do not appear on the balance sheet but may have a significant impact on the firm's ability to generate future profits. So while the balance sheet method is simple, it is not accurate; there are better ways of accomplishing the task of valuation.

Cash vs. Profits

Another way to value the firm is to consider the future flow of cash. Since cash today is worth more than the same amount of cash tomorrow, a valuation model based on cash flow can discount the value of cash received in future years, thus providing a more accurate picture of the true impact of financial decisions.

Decisions about finances affect operations and vice versa; a company's finances and operations are interrelated. The firm's working capital flows in a cycle, beginning with cash that may be converted into equipment and raw materials. Additional cash is used to convert the raw materials into inventory, which then is converted into accounts receivable and eventually back to cash, completing the cycle. The goal is to have more cash at the end of the cycle than at the beginning.

The change in cash is different from accounting profits. A company can report consistent profits but still become insolvent. For example, if the firm extends customers increasingly longer periods of time to settle their accounts, even though the reported earnings do not change, the cash flow will decrease. As another example, take the case of a firm that produces more product than it sells, a situation that results in the accumulation of inventory. In such a situation, the inventory will appear as an asset on the balance sheet, but does not result in profit or loss. Even though the inventory was not sold, cash nonetheless was consumed in producing it.

Note also the distinction between cash and equity. Shareholders' equity is the sum of common stock at par value, additional paid-in capital, and retained earnings. Some people have been known to picture retained earnings as money sitting in a shoe box or bank account. But shareholders' equity is on the opposite side of the balance sheet from cash. In fact, retained earnings represent shareholders' claims on the assets of the firm, and do not represent cash that can be used if the cash balance gets too low. In this regard, one can say that retained earnings represent cash that already has been spent.

Shareholder equity changes due to three things:

1. net income or losses
2. payment of dividends
3. share issuance or repurchase.

Changes in cash are reported by the cash flow statement, which organizes the sources and uses of cash into three categories: operating activities, investing activities, and financing activities.

Cash Cycle

The duration of the cash cycle is the time between the date the inventory (or raw materials) is paid for and the date the cash is collected from the sale of the inventory. A company's cash cycle is important because it affects the need for financing. The cash cycle is calculated as:

days in inventory + days in receivables - days in payables

Financing requirements will increase if either of the following occurs:

- Sales increase while the cash cycle remains fixed in duration. Increased sales increase the value of assets in the cycle.
- Sales remain flat but the cash cycle increases in duration.

While financially it makes sense to reduce the length of the cash cycle, such a reduction should not be done without considering the impact on operations. For example, one must consider the impact on customer and supplier relations as well as the impact on order fill rates.

Revenue, Expenses, and Inventory

A firm's income is calculated by subtracting its expenses from its revenue. However, not all costs are considered expenses; accounting standards and tax laws prohibit the expensing of costs incurred in the production of inventory. Rather, these costs must be allocated to inventory accounts and appear as assets on the balance sheet. Once the finished goods are drawn from inventory and sold, these costs are reported on the income statement as the cost of goods sold (COGS). If one wishes to know how much product the firm actually produced, the cost of goods produced in an accounting period is determined by adding the change in inventory to the COGS.

Assets

Assets can be classified as current assets and long-term assets. It is useful to know the number of days of certain assets and liabilities that a firm has on hand. These numbers are easily calculated from the financial statements as follows:

Accounts Receivable (A/R)

Number of days of A/R = (accounts receivable / annual credit sales) (365).
This also is known as the collection period.

Inventory

Number of days of inventory = (inventory / annual COGS) (365).
This also is known as the inventory period.

On the liabilities side:

Payables

Number of days of accounts payable = (accounts payable / COGS) (365), assuming that all accounts payable are for the production of goods. This also is known as the payables period.

Financial Ratios

A firm's performance can be evaluated using various financial ratios. Ratios are used to measure leverage, margins, turnover rates, return on assets, return on equity, and liquidity. Additional insight can be gained by comparing ratios among firms in the industry.

Bank Loans

Bank loans can be classified according to their durations. There are short-term loans (one year or less), long-term loans (also known as term loans), and revolving loans that allow one to borrow up to a specified credit level at any time over the duration of the loan. Some revolving loans automatically renew at maturity; these loans are said to be "evergreen."

Sources and Uses of Cash

It can be worthwhile to know where a firm's cash is originating and how it is being used. There are two sources of cash: reducing assets or increasing liabilities or equity. Similarly, a company uses cash either by increasing assets or decreasing liabilities or equity.

Sustainable Growth

A company's sustainable growth rate is calculated by multiplying the ROE by the earnings retention rate.

Firm Value, Equity Value, and Debt Value

The value of the firm is the value of its assets, or rather, the present value of the unlevered free cash flow resulting from the use of those assets. In the case of an all-equity financed firm, the equity value is equal to the firm value. When the firm has issued debt, the debt holders have a priority claim on their interest and principal, and the equity holders have a residual claim on what remains after the debt obligations are met. The sum of the value of the debt and the value of the equity then is equal to the value of the firm, ignoring the tax benefits from the interest paid on the debt. Considering taxes, the effective value of the firm will be higher since a levered firm has a tax benefit from the interest paid on the debt. If there is outstanding preferred stock, the firm value is the sum of the equity value, debt value, and preferred stock value, plus the value of the interest tax shield.

The debt holders and stock holders each have a claim on the cash flows of the firm. In a given time period, the debt holders have a claim equal to the interest payments during that period plus any principal payments that are due. The stock holders then have a claim equal to the unlevered free cash flow in that period plus the cash generated by the interest tax shield, minus the claims of the debt holders.

Capital Structure

The proportion of a firm's capital structure supplied by debt and by equity is reported as either the debt to equity ratio (D/E) or as the debt to value ratio (D/V), the latter of which is equal to the debt divided by the sum of the debt and the equity.

One can quickly convert between the D/E ratio and the D/V ratio by using the following relationships:

$$D / V = (D / E) / (1 + D / E)$$

$$D / E = (D / V) / (1 - D / V)$$

Risk Premiums

- Business risk is the risk associated with a firm's operations. It is the undiversifiable volatility in the operating earnings (EBIT). Business risk is affected by the firm's investment decisions. A measure for the business risk is the asset beta, also known the unlevered beta. In terms of the discount rate, the return on assets of a firm can be expressed as a function of the risk-free rate and the business risk premium (BRP):

$$rA = rF + BRP$$

- Financial risk is associated with the firm's capital structure. Financial risk magnifies the business risk of a firm. Financial risk is affected by the firm's financing decision.

- Total corporate risk is the sum of the business and financial risks and is measured by the equity beta, also known as the levered beta. The business risk premium (BRP) and financial risk premium (FRP) are reflected in the levered (equity) beta, and the return on levered equity can be written as:

$$rE = rF + BRP + FRP$$

Debt beta is a measure of the risk of a firm's defaulting on its debt. The return on debt can be written as:

$$rD = rF + \text{default risk premium}$$

Cost of Capital

The cost of capital is the rate of return that must be realized in order to satisfy investors. The cost of debt capital is the return demanded by investors in the firm's debt; this return largely is related to the interest the firm pays on its debt. In the past some managers believed that equity capital had no cost if no dividends were paid; however, equity investors incur an opportunity cost in owning the equity of the firm and they therefore demand a rate of return comparable to what they could earn by investing in securities of comparable risk.

The return required by debt holders is found by applying the CAPM:

$$rD = rF + \text{betadebt} (rM - rF)$$

The required rate of return on assets (that is, on unlevered equity) can be found using the CAPM:

$$rA = rF + betaunlevered (rM - rF)$$

Using the CAPM, a firm's required return on equity is calculated as:

$$rE = rF + betalevered (rM - rF)$$

Under the Modigliani-Miller assumptions of constant cash flows and constant debt level, the required return on equity is:

$$rE = rA + (1-\tau)(rA - rD)(D / E)$$

where τ is the corporate tax rate.

The overall cost of capital is a weighted-average of the cost of its equity capital and the after-tax cost of its debt capital. The weighted average cost of capital (WACC) then is given by:

$$WACC = rE (E / VL) + rD (1-\tau)(D / VL)$$

Assuming perpetuities for the cash flows, the weighted average cost of capital can be calculated as:

$$WACC = rA [1 - \tau(D / VL)]$$

Neglecting taxes, the WACC would be equal to the expected return on assets because the WACC is the return on a portfolio of all the firm's equity and all of its debt, and such a portfolio essentially has claim to all of the firm's assets.

For arbitrary cash flows, and under the assumption that the debt to value ratio is held constant, the following relationship derived by James A. Miles and John R. Ezzell is applicable:

$$WACC = rA - \tau rD (D / VL)(1+rA) / (1+rD)$$

Under the same assumptions, the cost of equity capital can be calculated from rA and rD using the following relationship from Miles and Ezzell:

$$rE = rA + [1 - \tau rD / (1+rD)] [rA - rD] D/E$$

For low values of rD, $[1 - \tau rD / (1+rD)]$ is approximately equal to one, and the expression can be simplified if high precision is not required.

If one cannot assume a constant debt to value ratio, then the APV method should be used.

Estimating Beta

In order to use the CAPM to calculate the return on assets or the return on equity, one needs to estimate the asset (unlevered) beta or the equity (levered) beta of the firm. The beta that often is reported for a stock is the levered beta for the firm. When estimating a beta for a particular line of business, it is better to use the beta of an existing firm in that exact line of business (a pure play) rather than an average beta of several firms in similar lines of business that are not exactly the same.

Expressing the levered beta, unlevered beta, and debt beta in terms of the covariance of their corresponding returns with that of the market, one can derive an expression relating the three betas. This relationship between the betas is:

$$\text{beta}_{\text{levered}} = \text{beta}_{\text{unlevered}} - [\ 1 + (1 - \tau)\ D/E\ ] - \text{beta}_{\text{debt}}(1 - \tau)\ D/E$$

$$\text{beta}_{\text{unlevered}} = [\ \text{beta}_{\text{levered}} + \text{beta}_{\text{debt}}(1 - \tau)\ D/E\ ] \ / \ [\ 1 + (1 - \tau)\ D/E\ ]$$

The debt beta can be estimated using CAPM given the risk-free rate, bond yield, and market risk premium.

Unlevered Free Cash Flows

To value the operations of the firm using a discounted cash flow model, the unlevered free cash flow is used. The unlevered free cash flow represents the cash generated by the firm's operations and is the cash that is free to be paid to stock and bond holders after all other operating cash outlays have been performed.

Terminal Value

The value of the firm at the end of the last year for which unique cash flows are projected is known as the terminal value. The terminal value is important because it can represent 50% or more of the total value of the firm.

Three Discounted Cash Flow Methods for Valuing Levered Assets

APV (Adjusted Present Value) Method
The APV approach first performs the valuation under an unlevered all-equity assumption, then adjusts this value for the effect of the interest tax shield. Using this approach,

VL = VU + PVITS

where VL = value if levered
VU = value if financed 100% with equity
PVITS = present value of interest tax shield

The unlevered value is found by discounting the unlevered free cash flow at the required return on assets. The present value of the interest tax shield is found by discounting the interest tax shield savings at the required return on debt, rD.

The APV method is useful for valuing firms with a changing capital structure since the return on assets is independent of capital structure. For example, in a leveraged buyout, the debt to equity ratio gradually declines, so the required return on equity and the weighted average cost of capital change as the lenders are repaid. However, when calculating the terminal value it may be appropriate to assume a stable capital structure, so in calculating the terminal value in a leveraged buyout situation the WACC method may be a better approach.

Flows to Equity Method

The flows to equity method sums the NPV of the cash flows to equity and to debt.

Then, VL = E + D

WACC Method
The WACC method discounts the unlevered free cash flow at the weighted average cost of capital to arrive at the levered value of the firm.

Cash Flows to Debt and Equity
When calculating the amount of cash flowing to debt and equity holders, it is not appropriate to use the unlevered free cash flows because these cash flows do not reflect the tax savings from the interest paid. Starting with the UFCF, add back the taxes saved to obtain the total amount of cash available to suppliers of capital.

Hurdle Price

At times a firm may wish to know at what price it would have to sell its product for a particular investment to have a positive net present value. A procedure for determining this price is as follows:

- Express the operating cash flow in terms of price. There may be multiple phases such as a short start-up period, a long operating period, and a final year in which the terminal value is calculated.
- Write out the expression for the NPV using the appropriate discount rate. For the longer operating period, one can calculate an annuity factor to multiply by the operating cash flow expression. Solve the expression for the cash flow that would result in an NPV of zero.
- Since the operating cash flow was written in terms of price, the price now can be found.

Debt Valuation

While debt may be issued at a particular face value and coupon rate, the debt value changes as market interest rates change. The debt can be valued by determining the present value of the cash flows, discounting the coupon payments at the market rate of interest for debt of the same duration and rating. The final period's cash flow will include the final coupon payment and the face value of the bond.

Investment Decision

If the unlevered NPV of a project is negative, aside from potential strategic benefits, the project is destroying value, even if the levered NPV is positive. The firm always could benefit from the tax shield of debt by borrowing money and putting it to other uses such as stock buybacks.

Optimal Capital Structure

The total value of a firm is the sum of the value of its equity and the value of its debt. The optimal capital structure is the amount of debt and equity that maximizes the value of the firm.

Share Buyback

If a firm has extra cash on hand it may choose to buy back some of its outstanding shares. One interesting aspect of such transactions is that they can be based on information that the firm has that the market does not have. Therefore, a share buyback could serve as a signal that the share price has potential to rise at above average rates.

Mergers and Acquisitions

Companies may combine for direct financial reasons or for non-financial ones such as expanding a product line. The target firm usually is acquired at a premium to its market value, with the hope that synergies from the merger will exceed the price premium. Mergers and acquisitions do not always achieve their goals, as promised syngeries may fail to materialize.

Appendix

Compounding and Discounting

Compound annual growth rate (CAGR): $(FV/C)1/T - 1$

Continuous compounding: $FVt = C\ er\ t$

Perpetuity: $PV = C / r$

Growing perpetuity: $PV = C / (r - g)$

T-year annuity (T equally spaced payments): $PV = (C / r) [1 - 1/(1+r)T]$

T-year growing annuity: $PV = [C / (r - g)] \{ 1 - [(1+g) / (1+r)]T \}$

HP 19BII Calculator Tip
IRR Calculation:

- Press the yellow button then "EXIT" to reset the calculator.
- Press button under "FIN"
- Pess button under "CFLO"
- Press yellow button then INPUT to clear list
- Press button under "YES"
- Enter the initial cash inflow (negative number for outflow). Press "INPUT".
- For "FLOW(1)", enter the cash flow value for the end of year 1, then press "INPUT".
- Enter the number of periods for that value, then press "INPUT".
- For "FLOW(2)", enter the next cash flow value, then press "INPUT".
- The number of times will default to the previous number. Press "INPUT" to keep, or enter a new value.
- When the cash flow entries are complete, press the button under "CALC".
- Press the button under "IRR%" to calculate the IRR of the cash flow.

SECURITY ANALYSIS

Security analysis is about valuing the assets, debt, warrants, and equity of companies from the perspective of outside investors using publicly available information. The security analyst must have a thorough understanding of financial statements, which are an important source of this information. As such, the ability to value equity securities requires cross-disciplinary knowledge in both finance and financial accounting.

While there is much overlap between the analytical tools used in security analysis and those used in corporate finance, security analysis tends to take the perspective of potential investors, whereas corporate finance tends to take an inside perspective such as that of a corporate financial manager.

Equity Value and Enterprise Value

The equity value of a firm is simply its market capitalization; that is, the market price per share multiplied by the number of outstanding shares. The enterprise value, also referred to as the firm value, is the equity value plus the net liabilities. The enterprise value is the value of the productive assets of the firm, not just its equity value, based on the accounting identity:

$$\text{Assets} = \text{Net Liabilities} + \text{Equity}$$

Note that net values of the assets and liabilities are used. Any cash and cash-equivalents would be used to offset the liabilities and therefore are not included in the enterprise value.

As an analogy, imagine purchasing a house with a market value of $100,000, for which the owner has $50,000 in equity and a $50,000 assumable mortgage. To purchase the house, the new owner would pay $50,000 in cash and assume the $50,000 mortgage, for a total capital structure of $100,000. If $20,000 of that market value were due to $20,000 in cash locked in a safe in the basement, and the owner pledged to leave the money in the house, the cash could be used to pay down the $50,000 mortgage and the net assets would become $80,000 and the net liabilities would become $30,000. The "enterprise value" of the house therefore would be $80,000.

Valuation Methods

Two types of approaches to valuation are discounted cash flow methods and financial ratio methods.

Two discounted cash flow approaches to valuation are:

1. value the cash flow to equity, and
2. value the cash flow to the enterprise.

The "cash flow to equity" approach to valuation directly discounts the firm's cash flow to the equity owners. This cash flow takes the form of dividends or share buybacks. While intuitively straightforward, this technique suffers from numerous drawbacks. First, it is not very useful in identifying areas of value creation. Second, changes in the dividend payout ratio result in a change in the calculated value of the company even though the operating performance might not change. This effect must be compensated by adjusting the discount rate to be consistent with the new payout ratio. Despite its drawbacks, the equity approach often is more appropriate when valuing financial institutions because it treats the firm's liabilities as a part of operations. Since banks have significant liabilities that are owed to the retail depositors, they indeed have significant liabilities that are part of operations.

The "cash flow to the enterprise" approach values the equity of the firm as the value of the operations less the value of the debt. The value of the operations is the present value of the future free cash flows expected to be generated. The free cash flow is calculated by taking the operating earnings (earnings excluding interest expenses), subtracting items that required cash but that did not reduce reported earnings, and adding non-cash items that did reduce reported earnings but that did not result in cash expenditures. Interest and dividend payments are not subtracted since we are calculating the free cash flow available to all capital providers, both equity and debt, before financing. The result is the cash generated by operations. The free cash flow basically is the cash that would be available to shareholders if the firm had no debt - the cash produced by the business regardless of the way it is financed. The expected future cash flow then is discounted by the weighted average cost of capital to determine the enterprise value. The value of the equity then is the enterprise value less the value of the debt.

When valuing cash flows, pro forma projections are made a certain number of years into the future, then a terminal value is calculated for years thereafter and discounted back to the present.

Free Cash Flow Calculation

The free cash flow (FCF) is calculated by starting with the profits after taxes, then adding back depreciation that reduced earnings even though it was not a cash outflow, then adding back after-tax interest (since we are interested in the cash flow from operations), and adding back any non-cash decrease in net working capital (NWC). For example, if accounts receivable decreased, this decrease had a positive effect on cash flow.

If the accounting earnings are negative and the free cash flow is positive, the carry-forward tax benefit is in effect realized in the current year and must be added to the FCF calculation.

Leverage

In 1958, economists and now Nobel laureates Franco Modigliani and Merton H. Miller proposed that the capital structure of a firm did not affect its value, assuming no taxes, no

bankruptcy costs, no transaction costs, that the firm's investment decisions are independent of capital structure, and that managers, shareholders, and bondholders have the same information. The mix of debt and equity simply reallocates the cash flow between stockholders and bondholders, but the total amount of the cash flow is independent of the capital structure. According to Modigliani and Miller's first proposition, the value of the firm if levered equals the value if unlevered:

$$VL = VU$$

However, the assumptions behind Proposition I do not all hold. One of the more unrealistic assumptions is that of no taxes. Since the firm benefits from the tax deduction associated with interest paid on the debt, the value of the levered firm becomes:

$$VL = VU + tcD$$

where tc = marginal corporate tax rate.

When considering the effect of taxes on firm value, it is worthwhile to consider taxes from a potential investors point of view. For equity investors, the firm first must pay taxes at the corporate tax rate, tc, then the investor must pay taxes at the individual equity holder tax rate, te. Then for debt holders,

$$\text{After-tax income} = (\text{debt income})(1 - td)$$

For equity holders,

$$\text{After-tax income} = (\text{equity income})(1 - tc)(1 - te)$$

The relative advantage (if any) of equity to debt can be expressed as:

$$\text{Relative Advantage (RA)} = (1 - tc)(1 - te) / (1 - td)$$

RA > 1 signifies a relative advantage for equity financing.
RA < 1 signifies a relative advantage for debt financing.

One can define T as the net advantage of debt :

$$T = 1 - RA$$

For T positive, there is a net advantage from using debt; for T negative there is a net disadvantage.

Empirical evidence suggests that T is small; in equilibrium T = 0. This is known as Miller's equilibrium and implies that the capital structure does not affect enterprise value (though it can affect equity value, even if T=0).

Calculating the Cost of Capital

Note that the return on assets, ra, sometimes is referred to as ru, the unlevered return.

Gordon Dividend Model:

$$P0 = Div1 / (re – g)$$

where

P0 = current stock price,
Div1 = dividend paid out one year from now,
re = return of equity
g = dividend growth rate
Then:

$$re = (Div1 / P0) + g$$

Capital Asset Pricing Model:

The security market line is used to calculate the expected return on equity:

$$re = rf + \beta e (rm – rf)$$

where

rf = risk-free rate,
rm = market return
βe = equity beta

However, this model ignores the effect of corporate income taxes.

Considering corporate income taxes:

$$re = rf (1 – tc) + \beta e [rm – rf (1 – tc)]$$

where tc = corporate tax rate.

Once the expected return on equity and on debt are known, the weighted average cost of capital can be calculated using Modigliani and Miller's second proposition:

$$WACC = re\ E / (E + D) + rd\ D / (E + D)$$

Taking into account the tax shield:

$$WACC = re\ E / (E + D) + rd (1 – tc) D / (E + D)$$

For T = 0 (no tax advantage for debt), the WACC is equivalent to the return on assets, ra.

rd is calculated using the CAPM:

$$rd = rf + \beta d [rm – rf (1 – tc)]$$

For a levered firm in an environment in which there are both corporate and personal income taxes and in which there is no tax advantage to debt (T=0), WACC is equal to ra, and the above WACC equation can be rearranged to solve for re:

$$re = ra + (D/E)[ra – rd(1 – tc)]$$

From this equation it is evident that if a firm with a constant future free cash flow increases its debt-to-equity ratio, for example by issuing debt and repurchasing some of its shares, its cost of equity will increase.

ra also can be calculated directly by first obtaining a value for the asset beta, βa, and then applying the CAPM. The asset beta is:

$$\beta a = \beta e (E / V) + \beta d (D / V)(1 – tc)$$

Then return on assets is calculated as:

$$ra = rf (1 – tc) + \beta a [rm – rf (1 – tc)]$$

In summary, for the case in which there is personal taxation and in which Miller's Equilibrium holds (T = 0), the following equations describe the expected returns on equity, debt, and assets:

$$re = rf (1 – tc) + \beta e [rm – rf (1 – tc)]$$

$$ra = rf (1 – tc) + \beta a [rm – rf (1 – tc)]$$

$$rd = rf + \beta d [rm – rf (1 – tc)]$$

The cost of capital also can be calculated using historical averages. The arithmetic mean generally is used for this calculation, though some argue that the geometric mean should be used.

Finally, the cost of equity can be determined from financial ratios. For example, the cost of unleveraged equity is:

$$re,U = [re, L + rf,debt (1 – tc) D/E] / (1 + D/E)$$

$$re,L = b(1+g) / (P/E) + g$$

where b = dividend payout ratio

$$g = (1 – b) (ROE)$$

where (1 – b) = plowback ratio.

The payout ratio can be calculated using dividend and earnings ratios:

$$b = (Dividend / Price) (Price / Earnings)$$

Share Buy-Back

Take a firm that is 100% equity financed in an environment in which T is not equal to zero; i.e., there is a net tax advantage to debt. If the firm decides to issue debt and buyback shares, the levered value of the firm then is:

$$VL = VU + T (debt)$$

The number of shares that could be repurchased then is:

$$n = (debt) / (price per share after relevering)$$

where the price per share after relevering is:

$$VL / (original number of outstanding shares)$$

The buyback will lower the firm's WACC.

Project Valuation

The NPV of a capital investment made by a firm, assuming that the investment results in an annual free cash flow P received at the end of each year beginning with the first year, and assuming that the asset is financed using current debt/equity ratios, is equal to:

$$NPV = – P0 + P / WACC$$

Warrant Valuation

Warrants are call options issued by the firm and that would require new shares to be issued if exercised. Any outstanding warrants must be considered when valuing the equity of the firm. The Black-Scholes option pricing formula can be used to value the firm's warrants.

Valuation Calculation

Once the free cash flow and WACC are known, the valuation calculation can be made. If the free cash flow is equally distributed across the year, an adjustment is necessary to shift the year-end cash flows to mid-year. This adjustment is performed by shifting the cash flow by one-half of a year by multiplying the valuation by (1 + WACC)1/2.

The enterprise value includes the value of any outstanding warrants. The value of the warrants must be subtracted from the enterprise value to calculate the equity value. This result is divided by the current number of outstanding shares to yield the per share equity value.

PEG Ratio

As a rule of thumb, the P/E ratio of a stock should be equal to the earnings growth rate. Mathematically, this can be shown as follows:

P = D / re + PVGO

where

P = price

D = annual dividend

re = return on equity

PVGO = present value of growth opportunities.

For high growth firms, PVGO usually dominates D / re. PVGO is equal to the earnings divided by the earnings growth rate.

Treatment of Goodwill

Prior to 2002, amortization of goodwill was an expense on the income statement, but unlike depreciation of fixed assets, amortization of goodwill is not tax deductible.

In 2002, FASB Statement No. 142 discontinued the depreciation of goodwill and specified that it be kept on the books as a non-depreciating asset and written off only when its value is determined to have declined.

Glossary

APV: Adjusted Present Value

CAPM: Capital Asset Pricing Model

EBIT: Earnings Before Interest and Taxes

EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization

Enterprise Value: Market value of a firm's equity plus the net market value of its debt.

Enterprise value = market cap + LTD - net cash & investments
FCF: Free Cash Flow

LTD: Long-Term Debt

MRP: Market risk premium, defined as rm – rf , unless it specifically is referred to as tax-adjusted market risk premium, in which case there would be a factor to adjust rf for taxes.

NOPLAT: Net Operating Profits Less Adjusted Taxes

OLS: Ordinary Least Squares (method of regression)

PEG: The ratio of P/E to growth rate in earnings.

RADR: Risk Adjusted Discount Rate

RAYTM: Rating-Adjusted Yield-To-Maturity

ROE: Return On Equity; equivalent to the expected return on retained earnings

YTM: Yield To Maturity

FINANCIAL RATIOS

A firm's performance can be evaluated using financial ratios. Referencing these ratios to those of other firms allows a comparison to be made. The following is a listing of some useful ratios.

Leverage : Assets / Shareholder's Equity

Gross Margin = Gross Profit / Sales.
Gross margin measures the profitability considering only variable costs and is a measure of the percentage of revenue that goes to fixed costs and profit.

Net Profit Margin = Net Income / Sales

Total Asset Turnover = defined as Sales / Total Assets

Return on Assets (ROA) = Net Income / Assets
ROA is a measure of the return on money provided by both owners and creditors, and is a measure of how efficiently all resources are managed.

Return on Equity (ROE) = defined as Net Income / Equity
where the equity value is the shareholder's equity at the end of the period in which the income was earned. ROE is a measure of the return on money provided by the firm's owners.

ROE can be calculated indirectly as:

$$ROE = (\text{Net Income} / \text{Total Assets})(\text{Total Assets} / \text{Equity})$$

ROE also can be calculated using DuPont analysis :

$$ROE = (\text{Net Income} / \text{Sales})(\text{Sales} / \text{Total Assets})(\text{Total Assets} / \text{Equity})$$

This states that ROE is determined by multiplication of three levers:

$$ROE = (\text{net profit margin})(\text{total asset turnover})(\text{leverage})$$

These levers are readily viewed on the company's financial statements. While ROE's may be similar among firms, the levers may differ significantly.

Liquidity

The term working capital is used to describe the current items of the balance sheet. Working capital includes current assets such as cash, accounts receivable, and inventory, and current liabilities such as accounts payable and other short term liabilities. Net

working capital is defined as non-cash current operating assets minus non-debt current operating liabilities. Cash, short-term debt, and current portion of long-term debt are excluded from the net working capital calculation because they are related to financing and not to operations.

Two commonly used liquidity ratios are the current ratio and the quick ratio.

Current Ratio : defined as Current Assets / Current Liabilities.
The current ratio is a measure of the firm's ability to pay off current liabilities as they become due.

Quick Ratio : defined as Quick Assets / Current Liabilities.

The quick ratio also is known as the acid test. Quick assets are defined as cash, accounts receivable, and notes receivable - essentially current assets minus inventory.

FREE CASH FLOW

When valuing the operations of a firm using a discounted cash flow model, the operating cash flow is needed. This operating cash flow also is called the unlevered free cash flow (UFCF). The term "free cash flow" is used because this cash is free to be paid back to the suppliers of capital.

Calculating Free Cash Flow

For a particular year, the unlevered free cash flow is calculated as follows:

1. Start with the annual sales and subtract cash costs and depreciation to calculate the earnings before interest and taxes (EBIT). The EBIT also is referred to as the operating income and represents the pre-tax earnings without regard to how the business is financed.

2. Calculate the earnings before interest and after tax (EBIAT) by multiplying the EBIT by one minus the tax rate. Note that the EBIAT represents the after-tax earnings of the firm as if it were financed entirely with equity capital.

3. To arrive at the UFCF, add the depreciation expense back to the EBIAT, and subtract capital expenditures (CAPEX) that were not charged against earnings and subtract any investments in net working capital (NWC).

The free cash flow calculation in equation form:

Operating Income (EBIT) = Revenues – Cash Costs – Depreciation Expense

EBIAT = EBIT – Taxes, where Taxes = (tax rate)(EBIT)

UFCF = EBIAT + Depreciation Expense – CAPEX – Increase in NWC

Capital expenditures are calculated by solving for CAPEX in the following equation:

BV of Assets at Year End = BV of assets at Beginning of Year
+ CAPEX
– Depreciation

An additional cash adjustment may be necessary for an increase in deferred taxes that would have a positive impact on cash flow.

TERMINAL VALUE

In a discounted cash flow valuation, the cash flow is projected for each year into the future for a certain number of years, after which unique annual cash flows cannot be forecasted with reasonable accuracy. At that point, rather than attempting to forecast the varying cash flow for each individual year, one uses a single value representing the discounted value of all subsequent cash flows. This single value is referred to as the terminal value.

The terminal value can represent a large portion of the valuation. The terminal value of a piece of manufacturing equipment at the end of its useful life is its salvage value, typically less than 10% of the present value. In contrast, the terminal value associated with a business often is more than 50% of the total present value. For this reason, the terminal value calculation often is critical in performing a valuation. The terminal value can be calculated either based on the value if liquidated or based on the value of the firm as an ongoing concern.

Terminal Value if Liquidated

If the firm is to be liquidated, the liquidation value can be based on book value, salvage value, or break-up value, but liquidation value usually understates the terminal value of a healthy business. One must make assumptions about the salvage value of the assets and net working capital. The net working capital may have a certain recovery rate since it might not be readily liquidated at balance sheet values. In the pro forma projections, one often may assume that net working capital will grow at the same rate as cash flow. The terminal value if the firm is liquidated then is the sum of the discounted value of the cash flow, the recovered net working capital, and the salvage value of the long-term assets, including any tax benefits.

Terminal Value of the Ongoing Firm

For an ongoing firm, the terminal value may be determined by either using discounted cash flow (DCF) estimates or by using multiples from comparable firms.

For the DCF method, if the unlevered free cash flow is growing at a rate of g per year for a set number of years, the terminal value can be calculated by modeling the cash flow as a T-year growing perpetuity. At the end of T years, one can assume a different growth rate (possibly zero) or liquidation. If multiples from comparable firms are used, the price/earnings ratio, market/book values, or cash flow multiples are commonly used.

The unlevered terminal value is calculated using the return on assets (rA) as the discount rate. The levered terminal value is calculated using the weighted average cost of capital (WACC) as the discount rate.

Terminal Value of the Debt

The terminal value of debt or preferred stock is simply the projected book value of the debt or preferred stock in the year that the terminal value is being calculated.

Terminal Value of the Common Stock

The terminal value of the common stock is the total levered terminal value less the terminal value of the debt, less the terminal value of the preferred stock (adding in the amount from any warrants that are exercised at their exercise price), plus the cash gained from the exercise of any common and preferred warrants.

DEBT VALUATION

In the enterprise model of valuation, the firm's equity value is calculated by subtracting the value of the firm's debt from the enterprise value. Debt valuation then becomes an important component of a valuation of the firm's equity.

A company's debt is valued by calculating the payoffs that debt holders can expect to receive, taking into account the risk of default. The default risk is addressed by considering the probability of default and the amount that could be recovered in that event. For modeling purposes, one may assume that the cash flow from the recovered amount is realized at the end of the year of default.

Debt valuation may take one of the following two approaches:

1. Discount the expected cash flow at the expected bond return; or
2. Discount the scheduled bond payments at the rating-adjusted yield-to-maturity.

Debt Valuation - Method 1

Discount the expected cash flow at the expected bond return

Under this method, the value of the bond is the sum of the expected annual cash flows discounted at the expected bond return:

$$\text{Value} = \text{the sum for each year } t \text{ of } E(\text{cash flow})t \,/\, (1 + r_{debt})t$$

where $E(\text{cash flow})t$ = expected cash flow in year t.

For a one year bond: $\text{Value} = E(\text{cash flow}) / [1 + E(r_d)]$

The expected bond return is the risk-adjusted discount rate, r_{debt}.

The expected cash flow is the cash flow considering the probability of default:

$$E(\text{cash flow}) = \pi (1 + C) F + (1 - \pi) \lambda F$$

where

π = probability of no default
λ = recovery rate in case of default, (percentage of face value)
C = annual coupon rate of the bond
F = face value of the bond

rdebt can be calculated using the CAPM:

$$rdebt = rf + \beta debt \Pi S\&P500$$

where

$\Pi S\&P500$ = risk premium for the market portfolio
$\beta debt$ = covariance between rdebt and the market return;
rf = yield to maturity on a risk-free bond having the same maturity.

If $\beta debt$ is not known, it can be found using ordinary least squares regression.

If $\pi = 1$ (no default risk), then rdebt = yield to maturity.

The difference in rdebt and YTM reflects the default risk.

Debt Valuation - Method 2

Discount the scheduled bond payments at the rating-adjusted yield-to-maturity

For this method, estimate the rating-adjusted yield-to-maturity (RAYTM) by averaging the market yield-to-maturities (YTM) of bonds in the same group. The promised cash flows then are discounted at this rate that already has factored in the default risk.

Markov Chain Representation

A firm's debt rating can change over time, and the value of future cash flows should take into account the possibility of one or more rating changes. In this regard, bond valuation can be modeled as a Markov Chain problem in which a transition matrix is constructed for the probabilities of the firm's debt moving from one rating to another. For example, if there are five possible ratings: A, B, C, D, E, and F; and πxy represents the probability of moving from state x to state y, then the transition matrix would look like the following:

πAA	πAB	πAC	πAD	πAE
πBA	πBB	πBC	πBD	πBE
πCA	πCB	πCC	πCD	πCE
πDA	πDB	πDC	πDD	πDE
πEA	πEB	πEC	πED	πEE

For multiple periods, the transition matrices for each period must be multiplied in order to calculate the multi-period probabilities. This multiplication easily can be performed by spreadsheet software.

BLACK-SCHOLES OPTION PRICING FORMULA

In their 1973 paper, The Pricing of Options and Corporate Liabilities, Fischer Black and Myron Scholes published an option valuation formula that today is known as the Black-Scholes model. It has become the standard method of pricing options.

The Black-Scholes formula calculates the price of a call option to be:

$$C = S\,N(d1) - X\,e\text{-}rT\,N(d2)$$

where

C = price of the call option
S = price of the underlying stock
X = option exercise price
r = risk-free interest rate
T = current time until expiration
N() = area under the normal curve
d1 = [ln(S/X) + (r + σ2/2) T] / σ T1/2
d2 = d1 - σ T1/2

Put-call parity requires that:

$$P = C - S + Xe\text{-}rT$$

Then the price of a put option is:

$$P = Xe\text{-}rT\,N(-d2) - S\,N(-d1)$$

Assumptions

The Black-Scholes model assumes that the option can be exercised only at expiration. It requires that both the risk-free rate and the volatility of the underlying stock price remain constant over the period of analysis. The model also assumes that the underlying stock does not pay dividends; adjustments can be made to correct for such distributions. For example, the present value of estimated dividends can be deducted from the stock price in the model.

Warrant Pricing

Warrants are call options issued by a corporation. They tend to have longer durations than do exchange-traded call options. Warrants can be valued by the Black-Scholes model, but some modifications must be made to the parameters.

When warrants are exercised, the company typically issues new shares at the exercise price to fill the order. The resulting increase in shares outstanding dilutes the share value. If there were n shares outstanding, and m warrants are exercised, α represents the percentage of the value of the firm that is represented by the warrants, where

$$\alpha = m / (m + n)$$

When using the Black-Scholes model to value the warrants, it is worthwhile to use total amounts instead of per share amounts in order to better account for the dilution. The current share price S becomes the enterprise value (less debt) to be acquired by the warrant holders. The exercise price is the total warrant exercise amount, adjusted for the fact that in paying cash to the firm to exercise the warrants, the warrant holders in effect are paying a portion of the cash, α, to themselves.

The inputs to the Black-Scholes model for both option pricing and warrant pricing are outlined in the following table.

Black-Scholes Parameters for Pricing Options and Warrants

Input Parameter	Option Pricing	Warrant Pricing
S	current share price	α V, where V is enterprise value minus debt.
X	exercise price per share	total warrant exercise amount multiplied by $(1 - \alpha)$.
T	current time to expiration	average T for warrants
r	interest rate	interest rate
σ	standard deviation of stock return	standard deviation for returns on enterprise value, including warrants

MERGERS AND ACQUISITIONS

A corporate merger is the combination of the assets and liabilities of two firms to form a single business entity. In everyday language, the term acquisition tends to be used when a larger firm absorbs a smaller firm, and merger tends to be used when the combination is portrayed to be between equals. In a merger of firms that are approximate equals, there often is an exchange of stock in which one firm issues new shares to the shareholders of the other firm at a certain ratio. For the sake of this discussion, the firm whose shares continue to exist (possibly under a different company name) will be referred to as the acquiring firm and the firm whose shares are being replaced by the acquiring firm will be referred to as the target firm.

Excluding any synergies resulting from the merger, the total post-merger value of the two firms is equal to the pre-merger value. However, the post-merger value of each individual firm likely will be different from the pre-merger value because the exchange ratio of the shares probably will not exactly reflect the firms' values with respect to one another. The exchange ratio is skewed because the target firm's shareholders are paid a premium for their shares.

Synergy takes the form of revenue enhancement and cost savings. When two companies in the same industry merge, such as two banks, combined revenue tends to decline to the extent that the businesses overlap in the same market and some customers become alienated. For the merger to benefit shareholders, there should be cost saving opportunities to offset the revenue decline; the synergies resulting from the merger must be more than the initial lost value.

To calculate the minimum value of synergies required so that the acquiring firm's shareholders do not lose value, an equation can be written to set the post-merger share price equal to the pre-merger share price of the acquiring firm as follows:

$$\frac{\text{(pre-merger value of both firms + synergies)}}{\text{post-merger number of shares}} = \text{pre-merger stock price}$$

The above equation then can be solved for the value of the minimum required synergies.

The success of a merger is measured by whether the value of the acquiring firm is enhanced by it. The practical aspects of mergers often prevent the forecasted benefits from being fully realized and the expected synergy may fall short of expectations.

INVESTMENT MANAGEMENT

Investment management is about attaining investment objectives under specified constraints; for example, achieving the best possible return for a given level of risk. To meet these objectives, the investor may buy equity in an asset such a stock, a fund, or real estate, or buy debt issued by governments and corporations. By effectively managing such investments the investment manager can achieve a higher return for a specified acceptable level of risk. There are many tools for reaching this goal.

Expected Return and Portfolio Variance

The two basic metrics for an investment portfolio are the return and the variance.

In the case of an individual dividend-paying stock, the return is given by:

$$Ri = [(P1 + D1) / P0] - 1,$$

where D1 is the dividend paid at time t = 1.

The future return of a stock or a portfolio is not known with certainty; there are different probabilites for different return scenarios, one of which actually will unfold.

Given n possible return scenarios, each with its own probability pi, the expected return is:

$$E(R) = \Sigma i=1,n \; pi \; Ri$$

The variance of such a stock or portfolio is given by:

$$\sigma 2 = \Sigma i=1,n \; pi \; [Ri - E(R)]2$$

Portfolios

A portfolio has certain advantages over a single security. The return of one security may tend to move in the same direction as the return of another security, but in the opposite direction of the return of a third security. Because of these tendencies, when securities are grouped into a portfolio, for a given expected return the variance of that return can be reduced. The joint tendencies between the returns can be measured by covariances.

The covariance in two securities' returns is given by:

$$Cov(R1, R2) = \sigma 12 = \sigma 1 \sigma 2 \; \rho 12$$

The correlation coefficient between security i and the market is given by:

$$\rho im = \sigma im / \sigma i \, \sigma m$$

For two securities,

$$\sigma 2p = \Sigma i=1,n \, \Sigma j=1,n \, xixj \, \sigma ij$$

$$\sigma 2p = x21 \, \sigma 21 + x22 \, \sigma 22 + 2 \, x1 \, x2 \, \sigma 12$$

$$= x21 \, \sigma 21 + x22 \, \sigma 22 + 2 \, x1 \, x2 \, \sigma 1 \sigma 2 \, \rho 12$$

where x2 = 1 - x1

Note that if T-bills that earn the risk-free rate are included, σ for RF = 0.

Given two securities, many different portfolios can be constructed by varying the weighting of each security in the portfolio. To find the minimum variance portfolio,

$$\text{set } d\sigma 1 / dx1 = 0$$

$$\Rightarrow x1 = (\sigma 22 - \sigma 1 \sigma 2 \, \rho 12) / (\sigma 21 + \sigma 22 - 2 \, \sigma 1 \sigma 2 \, \rho 12)$$

For an equally weighted portfolio with all standard deviations equal and all covariances equal to zero:

$$Var(Rp) = (1/N2) \, \Sigma i=1,n \, Var(Ri)$$

$$= (1/N) \, Var(Ri)$$

$$= (1/N) \, \sigma 2i \text{ and}$$

$$\sigma p = (1/N1/2) \, \sigma i$$

Risk Adjusted Return

Different investors have different aversions to risk. When managing a portfolio for a particular investor, the goal is to maximize the portfolio return for the level of risk that the investor is willing to take. The following model can be used:

Maximize Z = E(Rp) - A Var(Rp)

where A = investor's aversion to risk as measured by the variance of the portfolio return.

To maximize the function assuming the investor's assets are only in the market portfolio and the riskfree asset,

first let wm = the fraction of assets in the market portfolio. Then

$$E(Rp) = rF + wm\ (Rm - rF)$$

and

$$Var(Rp) = w2m\ \sigma 2m.$$

Then

$$Z = rF + wm\ [E(Rm) - rF] - 0.5\ A\ w2m\ \sigma 2m$$

and

$$dZ/dwm = E(Rm) - rF - A\ wm\ \sigma 2m = 0$$

Solving for A,

$$A = [E(Rm) - rF] / (\ wm\ \sigma 2m)$$

Beta

The risk of an individual security in a well diversified portfolio can be measured by its beta. Such risk is nondiversifiable.

Beta of an individual security with respect to the market is:

$$\beta im = \sigma im / \sigma 2m = Cov(Ri, RSP500) / Var(RSP500)$$

Beta of a risk-free asset with respect to the market = 0.

Betas determined using historical data are subject to estimation error. Merrill Lynch and some other firms adjust this value back towards the mean beta of the market (=1) or industry using

$$\beta adjusted = w\ \beta historical + (1\text{-}w)\ \beta"true"$$

The lower the confidence in βhistorical, the lower should be the value chosen for w.

Beta of a portfolio:

$$\beta pm = \Sigma\ xi\ \beta im\ ,\ \text{where xi is the weight.}$$

One is willing to accept a lower return on a security or a portfolio having a negative beta since it can reduce the portfolio risk as part of a larger portfolio.

Efficient portfolios lie on the capital market line (CML). This CML is not a part of the CAPM. For this line to be used, there must be perfect correlation between the portfolio in question and the market portfolio. This implies that the line is only for those portfolios that are a combination of the tangential portfolio (usually the market portfolio) and the risk-free rate.

$$CML: E(Rp) = RF + [E(Rm) - RF] \sigma p / \sigma m$$

If borrowing is not permitted, the rational risk-averse investor will choose a portfolio along the capital market line up to the efficient frontier, and then follow the efficient frontier for levels of higher risk and return.

The variance and expected return of the market portfolio can be obtained by combining any two portfolios that lie on the efficient frontier and solving for the weights in the following expression:

$$E(Rm) = w1\ E(R1) + (1-w1)\ E(R2)$$

The covariance between any two portfolios on the efficient frontier can be found by finding the weights needed to emulate the market portfolio and then solving for $\sigma 12$ in the following equation:

$$\sigma 2p = w21\ \sigma 21 + w22\ \sigma 22 + 2\ w1\ w2\ \sigma 12$$

CAPM

The Sharpe-Lintner version of the capital asset pricing model implies that as a result of all investors holding the market portfolio, there is a linear relation between the expected return on a security and its β.

The following is the security market line - any security's expected return will lie on this line. This line applies to all securities, not just efficient portfolios.

$$E(Ri) = RF + [E(Rm) - RF] \beta im \text{ Sharpe-Lintner}$$

$$E(Ri) = Rz + [E(Rm) - Rz] \beta im \text{ Black}$$

Expected return of a portfolio using CAPM:

$$E(Rp) = RF + [E(Rm) - RF] \beta pm$$

If the assumption of equal borrowing and lending rates is relaxed, investors no longer are required to hold the market portfolio; instead, they can hold a range of portfolios along the efficient frontier between the point of tangency of the lending line and the point of tangency of the borrowing line.

CAPM requires the measure of two unknown quantities - market risk premium and beta. However, attempts to estimate expected returns by using historical stock return data have resulted in std errors about double those of CAPM, because for CAPM the better precision in the estimate of the market risk premium more than offsets the additional estimation error in beta.

There have been many difficulties in testing CAPM. Roll argued that the CAPM must always hold for ex post data if the proxy chosen for the market is efficient. He also argued that it is impossible to measure the true market, so the CAPM cannot be tested. However, in 1982 Stambaugh found that adding other risky assets such as corporate bonds, real estate, and consumer durables to the market portfolio did not materially affect the tests.

Single Factor Model (Market Model)

$$Rit = ai + \beta iRmt + eit \quad t = 1, ..., T$$

where eit is the distance from the regression line at time t. The mean value of eit = 0 and the covariance between Rm and ei = 0. This is a regression model that characterizes the risk of a security over time by measuring its beta over a time interval. βiis different from the βim used in the CAPM in that βim is more of a present-day beta rather than one taken over time. In the traditional approach of testing the CAPM, in the first step one uses this model to measure the beta of all securities (or portfolios). In the second step one estimates the CAPM itself by regressing the security returns on the estimated betas. When testing CAPM in this manner, one must question the validity of tests using ex post data to test the ex ante CAPM. Also, there is measurement error in individual security betas. Using portfolios instead in the first-pass regression helps.

Variance using the single-factor model:

$$Var(Ri) = \beta 2i \; Var(Rm) + Var(ei)$$

where Ri, Rm, and ei are random variables. The variance of the mean return ai is zero by definition, so this term falls out. In a well-diversified portfolio, Var(ei) = 0. In this equation, β2i Var(Rm) is the variance explained by the market. The percent of variance explained by the market then is given by

$$\beta 2i \; Var(Rm) / \sigma 2i = R2$$

Note that (1-R2) is the idiosyncratic variance.

These expressions apply to portfolios as well by replacing i with p.

For two portfolios or securities in which their ei's are uncorrelated, the covariance between them is given by:

$$\sigma ij = \beta i \, \beta j \, \sigma 2m \, .$$

This is derived by finding the covariance between:

$$Rit = ai + \beta iRmt + eit \text{ and } Rjt = ai + \beta jRmt + ejt$$

Cross Section of Common Stock Returns

Fama and French used a multi-factor model using additional risk factors related to size, price/book, etc.

They concluded that three "risk" factors were sufficient.

Gabriel Hawawini and Donald Keim's paper reports that stock returns depended size, E/P, CF/P, P/B, and prior returns. However, these factors were not due to risk.

The premia related to size and P/B are mainly due to the January effect. It is unlikely that the risk is higher in January. The size & P/B premia are uncorrelated across international markets. This is inconsistent with the notion of well-integrated international markets, in which similar risks should result in similar returns.

Market-Neutral Strategies

Market-neutral strategies balance the market risk by going long on some securities and short on others. Some people propose using the T-bill rate as a benchmark against which to compare the market return of a such a strategy. One can argue that even though the market-neutral strategy is risky, since it has zero beta it does not contribute to the risk of the market portfolio and therefore should not command a premium over the risk-free rate. On the other hand, if the expected returns on the long side are higher than those on the short, the benchmark return should exceed the risk-free rate.

Trading Costs

An important factor in the performance of high-turnover portfolios is the amount of the trading costs, including explicit costs such as commissions, fees, and taxes, the market maker spread, the impact of trading on market price, and the opportunity cost incurred during the delay between the time the decision is made and the time the trade is executed.

Trading costs can be reduced through passive fund management and electronic trading.

Long-Term Investing

The conventional wisdom is that over the long run, stock will generate returns superior to those of bonds. But while the variance of the geometric means of the returns declines as the time horizon increases, the variance of the terminal wealth increases. If a put option were purchased to insure a certain terminal wealth, the cost of that option would increase

as the time horizon increases. To the extent that option prices are a measure of risk, the risk of stock investments then increases as the time horizon lengthens.

The optimal asset allocation is a function of the present wealth, target future wealth, risk tolerance, and time horizon. Long-term returns are difficult to analyze statistically because as the historical time horizon increases, the number of possible independent samples of returns decreases. In 1991, Butler and Domian illustrated a procedure that attempts to overcome this difficulty by first listing the monthly returns for the S&P 500 and the long-term bonds over a long historical time horizon. By randomly selecting data, returns over various long-term holding periods can be emulated by multiplying the appropriate number of random samples. An almost limitless number of samples for each holding period can be generated using this method. Performing such an analysis with data taken from the 792 months from 1926-1991 indicates that over a 10-year time period, there is an 11% chance that stocks will underperform bonds; over a 20-year time period this probability reduces to 5%.

Defined-Benefit Pension Plans

In a defined-benefit plan, the plan sponsor (usually an employer) guarantees a level of future benefits to the plan participants, taking responsibility for any shortfall in the investment performance of the plan. FASB 87 requires that any unfunded liability in the present value of the benefits appear on the balance sheet of the employer. One alternative for the plan sponsor is to place the present value of the plan liability into government bonds of the same duration as the liability, in which case there is no chance of shortfall and the liability is fully immunized. Furthermore, because pension plans are not taxed, the incentive to hold equity in order to take advantage of lower taxes on capital gains is diminished. For a given level of risk, tax implications increase the return most for investments such as bonds, which have a large spread between pre-tax and after-tax return. An alternative to bonds is for the pension fund to place its money into riskier assets such as common stocks. Under this latter alternative, there exists both the chance of a shortfall and the chance of a surplus. However, FASB 87 does not permit a surplus to be reported as an asset on the sponsor's balance sheet, and the surplus often gets allocated to the plan participants. Nonetheless, for many reasons it is common for firms to hold equity in their pension funds. The Pension Benefit Guarantee Corporation (a federal agency) guarantees the benefits, and the sponsor's premiums are independent of the risk level of the pension fund's investments. For employers in financial distress, the pension guarantee from PBGC effectively is a put option. Given that put options increase in value as risk increases, there is an incentive for some firms to invest the pension fund in risky assets.

In defined-benefit plans there exists the opportunity for tax arbitrage. The plan sponsor can issue debt in order to buy equity in the pension plan. The pension plan then can invest the funds in bonds. Because of the tax status of the pension fund, the taxes on the pension plan's bond interest will be deferred, and the sponsor will enjoy the interest tax shield from its debt issuance. The sponsor then realizes an arbitrage profit equal to the interest rate multiplied by the corporate tax rate, with no increase in the firm's overall risk.

Arbitrage Pricing Theory

In 1976, Steve Ross presented the arbitrage pricing theory (APT) as an alternative to the CAPM that requires fewer assumptions. The APT is an equilibrium theory, which differs from a factor model in that it specifies relationships between expected returns across securities and attributes that influence those securities. A factor model allows the first term in the model, the expected return, to differ across securities and therefore can represent either and efficient or an inefficient market. Ross assumed that returns have the first term in common, and the other terms depend on several different systematic factors, as opposed to the single market risk premium factor of the CAPM. The model takes the form:

$$Rpt = E(Rp) + \beta p1I1t + \beta p2I2t + ... + \beta pKIKt + ept$$

where Ii = value of the ith factor, βpi = sensitivity of the return to the ith factor, k = number of factors, and ept equals the idiosyncratic variation in the return. Assuming an efficient market in equilibrium, the first term to the right of the equal sign is the same for all securities and is approximately equal to the risk-free rate. Examples of factors that could be included in the model are monthly industrial production, changes in expected inflation, unexpected inflation, unexpected changes in the risk premium, and unexpected shifts in the term structure of interest rates. Such variables likely affect most or all stocks.

Market-Neutral Strategies Revisited

Given that "alpha" is the return above the market return, by constructing a portfolio long on positive alpha stocks and short on negative alpha stocks, one can cancel the effect of the market. This market-neutral strategy sometimes is referred to as a "double alpha, no beta" strategy. Because such a strategy is uncorrelated with the market, the volatility depends on non-market factors. If the market-neutral portfolio is well-diversified across many types of industries, the volatility can be low. If the portfolio is concentrated in a smaller number of stocks and industries, the volatility can be high. Furthermore, if the portfolio is not balanced among stocks of different size or value/growth measures, there could be higher volatility as a result of these non-market risk factors.

Mutual Funds

Mutual funds charge fees to their investors. Transaction fees called loads sometimes are charged for fund purchases or redemptions. Such fees are deducted directly from the investor's account and represent a charge for the broker's service of providing information and fund selection advice. Operating expenses are fees that are deducted from the fund earnings before distribution to investors, and typically average slightly more than 1% per year. Two components of operating expenses are management fees and 12b-1 fees. The 12b-1 fees represent a reimbursement for the fund's marketing expenses.

Style Analysis

Mutual funds can be characterized according to investment style, such as value or growth. However, the actual fund composition may not correspond closely to its stated investment style, and reports of portfolio holdings may not be very representative since they are only snapshots taken at one point in time. This limitation makes the public's view of the holdings subject to distortions such as "window-dressing," in which the portfolio manager buys stocks that have performed well so that investors will see those stocks in the portfolio holdings (cost basis is not reported) and perceive the manager to be capable of selecting the top performers. Style analysis is a method of characterizing the true style of a fund based on its behavior, not on its stated objectives and holdings.

Style analysis is performed by first selecting a set of indices that correspond to particular styles, such as small-cap value, small-cap growth, large-cap value, large-cap growth, and cash. Using a weighted combination of these indices, one can construct a passive benchmark portfolio that tracks the return of the portfolio being analyzed as closely as possible. Assume that there are five indices available with which to compose the benchmark. The following steps are used to analyze the style:

Define the benchmark return for period t to be:
RBenchmark,t = w1R1,t + w2R2,t + w3R3,t + w4R4,t + w5R5,t

Define the tracking error to be:
et = RFund,t - RBenchmark,t

Solve for the weights by minimizing the standard deviation of the mean tracking error over the entire time period being analyzed under the constraint that the weights sum to one and are each greater than or equal to zero (unless net short positions are permitted in the fund). The standard deviation of the tracking error is given by:
$\sigma(e) = [(1 / T-1) \Sigma t=1,T (et - emean)2]1/2$

Evaluating Fund Performance

When the popular press publishes mutual fund performance rankings, it usually does not consider the risk that the portfolio manager took to achieve that return. Such rankings do not necessarily reflect the skill of the manager. To adjust for risk, one should consider the ratio of excess returns to risk, or consider risk-adjusted differential returns. For the risk, one can use standard deviations or betas.

The "Sharpe Measure": $[E(Rp) - E(RF)] / \sigma p$

The "Treynor Measure": $[E(Rp) - E(RF)] / \beta p$

Std dev. differential measure: $[E(Rp) - E(RF)] - [E(RB) - E(RF)] \sigma p / \sigma B$

"Jensen Measure": [E(Rp) - E(RF)] - [E(RB) - E(RF)] βp

The Jensen measure is perhaps the most widely used measure of fund performance.

In the above measures, Rp is the return of the portfolio under test, RB is the return of a passive benchmark portfolio, RF is the risk-free rate, and E(R) represents the mean historical returns.

In determining which measure to use, one should consider the purpose of the measurement.

For portfolios that represent a large portion of its investors' assets, a method that uses standard deviation should be used; the Sharpe Measure and the other Std. deviation differential measure are more appropriate.

For ranking fund performance, the ratio of excess return to risk should be measured; the Sharpe Measure or the Treynor Measure are more appropriate.

Market Efficiency

There is some evidence of some autocorrelation in stock prices. Small amounts of both positive autocorrelation, in which stock returns tend to move in the direction of the previous period, and negative autocorrelation, in which returns tend to move in a direction opposite to that of the previous period, have been observed. In situations of positive autocorrelation, momentum investing strategies should be employed, and in situations of negative autocorrelation, contrarian strategies should be used. However, for shorter term trading, any advantage from these techniques is neutralized by trading costs, and for longer terms there is not yet enough data to confirm or deny any net advantage.

Timing the Market

Some investors have attempted to time the market to increase their returns, increasing their stake in equities when they predict an up market and decreasing it when they predict a down market.

Bonds

Coupon bearing notes and bonds typically make fixed interest payments two times per year. Zero coupon bonds are sold at a discount and pay off their face values at maturity. Zero coupon treasury securities are issued by commercial institutions who separate the interest and principal payments. These zero coupon bonds are known as CAT's, TIGR's, and STRIP's.

Bond prices often are quoted in the format x:y, where x is the integer dollar amount and y is the fractional amount in 32nd's of a dollar.

The spot rate is the rate that would correspond to a single cash flow at maturity for a bond purchased today, as is the case with a zero coupon bond. A notation used for spot rates is rn, where n is the number of periods (e.g. years) into the future when a loan made today is to mature. The forward rate is the rate at which a future loan is made today. A notation used for forward rates is fm,n, where m is the number of periods from the present when the loan is to commence, and n is the number of periods into the future when the loan is to end. Forward rates can be expressed in terms of spot rates:

$$1 + fm,n = (1 + rn) / (1 + rm)$$

The ask price of a U.S. Treasury bill is calculated from the "asked" rate (not asked yield) as follows:

$$\text{Ask Price} = 10{,}000 [1 - \text{asked rate} (N / 360)]$$

where N = the number of days until maturity.

The implied rate (spot rate) is (10,000 / Ask Price - 1). This implied rate does not represent an annualized basis. The annualized rate is found by raising the implied rate to the 365/N power:

$$\text{Annualized Rate} = (\text{Implied Rate})^{365 / N}$$

The bond equivalent yield is the yield to maturity y that satisfies the following equation:

$$P = \Sigma n=1,N \; Cn / (1 + y/2)n$$

where P = price, Cn = cash flow at the end of each period, N = number of periods.

For a zero coupon bond there is only one cash flow at maturity.

The value of a coupon bond can be modeled as a portfolio of zero-coupon bonds having face values and maturity dates that correspond to the coupon payments and dates. Summing the prices of the zero-coupon bonds then would give the value of the coupon bond, and any difference would represent an arbitrage opportunity.

Forward rates can be calculated using the prices and returns of bills, notes, or bonds provided they cover the proper time periods. For example, given the six month spot rate r0.5, one can calculate the one year spot rate r1.0 by using the data for a one year note the following equation:

$$\text{Price} = \text{coupon1} / (1+r0.5) + (\text{coupon2} + \text{face value}) / (1+r1.0)$$

Once the spot rates are known, the forward rate can be calculated as already illustrated.

The spot rate is not quoted on an annualized basis. To annualize it:

$$\text{Annualized Yield} = (\text{Spot Rate})^{x/y}$$

where x is the number of periods in one year, and y is the number of periods included in the spot rate.

The duration of a bond often is thought of in terms of time until maturity. However, in addition to the payoff of the face value at maturity, there are the coupon payment cash flows that influence effective duration. Two bond with equal yield-to-maturities and maturity dates will have different effective durations if their coupon rates are different. Frederick Macaulay suggested the following method of determining duration:

$$\text{Effective Duration} = \Sigma t=1,T\ t\ \{\ [\ Ct\ /\ (\ 1+y/2\ )t\ ]\ /\ [\Sigma t=1,T\ Ct\ /\ (\ 1+y/2\ )t]\ \}$$

where T = life of the bond in semiannual periods,

Ct = cash flow at end of tth semiannual period,

y = yield to maturity, expressed as a bond-equivalent yield.

A zero-coupon bond has no coupon payments and therefore its effective duration always is equal to the time until maturity and does not change as yield-to-maturity changes. Duration essentially measures the sensitivity of a bond's price to movements in interest rates. By this definition, duration is defined as

$$D \text{ » } (\ D\ P\ /\ P\ )\ /\ [\ D\ (\ 1\ +\ r\ )\ /\ (\ 1\ +\ r\ )\ ]$$

If one plots the price of a non-callable bond as a function of its yield, the plot will be concave up (convex down) rather than linear. This curvature is called convexity, and in this case, positive convexity. Convexity is due to the fact that effective duration increases as interest rates decrease.

Because of the effectively shorter duration, the coupon bond yield curve will be below that of the zero coupon bond when forward rates are rising with time, and above it when they are dropping. Zero coupon rates often are more useful for capital budgeting purposes.

Research has found that diversified portfolios of junk bonds have lower variance than those of high-grade bonds. There are several contributing factors to this initially surprising result. First, while individual junk bonds are risky, much of this risk can be diversified in a portfolio. Second, because of the higher coupon rate, junk bonds effectively have a shorter duration than do higher grade bonds and therefore a lower sensitivity to interest rate movements. Third, junk bonds are more likely to be called than are higher-grade bonds, since there is a strong incentive to refinance at lower rates if the issuer's credit improves. This characteristic reduces the effective duration resulting in less volatility.

STOCK INDEXES

Stock indexes are useful for benchmarking portfolios, for generalizing the experience of all investors, and for determining the market return used in the Capital Asset Pricing Model (CAPM).

A hypothetical portfolio encompassing all possible securities would be too broad to measure, so proxies such as stock indexes have been developed to serve as indicators of the overall market's performance. In addition, specialized indexes have been developed to measure the performance of more specific parts of the market, such as small companies.

It is important to realize that a stock price index by itself does not represent an average return to shareholders. By definition, a stock price index considers only the prices of the underlying stocks and not the dividends paid. Dividends can account for a large percentage of the total investment return.

Weighting

One characteristic that varies among stock indexes is how the stocks comprising the index are weighted in the average. Even if no explicit weighting is applied when calculating an average, there may be an implicit one. While a one dollar price change in one stock in a simple stock price index will have the same effect as a one dollar change in any other stock, a given percentage increase of a higher price stock influences the index more than a corresponding percentage increase of a lower price stock. For example, a 1% change in a $100 stock will change the index more than a 1% change in a $10 stock. For this reason, indexes that are based on the simple summation of stock prices are referred to as price-weighted.

In a price-weighted index, a change in the stock price of the largest company in the index would influence the average no more than an equal change in the stock price of the smallest company in the index. However, the larger company's performance will have a greater impact on the economy. To consider the size of a company, a market capitalization weighted index (or value-weighted index) can be used, in which a company's impact on the index is proportional to the size of the company. In value-weighting, in effect the market capitalization of the stocks influence the index, not the prices. For this reason, there is no need to adjust for stock splits.

Some indexes do not weight for market capitalization, but do adjust for price differences to remove the implicit price weighting. This unweighted method tracks the performance of an index in which equal dollar amounts are invested in the underlying stocks. Some consider an unweighted index to be a good indicator of the market's performance from the perspective of the investor who places an equal amount of money in each stock in his or her portfolio, regardless of its market capitalization. However, if every investor placed an equal amount of money in each investment, relatively few investors would own small-

cap stocks, so an unweighted index would not reflect the portfolio performance of the average investor when all investors are considered.

There are hundreds of indexes that are designed to measure the broad market or specific parts of it. Here are some of the more commonly-used indexes, listed in alphabetical order.

Dow Jones Industrial Average

The Dow Jones Industrial Average is a price-weighted index of industrial stocks and is the most widely quoted stock index.

In the early 1880's, there was no broad market measure - investors focused on the prices of individual stocks. On July 3rd, 1884 Dow Jones & Co. first published an index of 11 companies in the Customer's Afternoon Letter, which later became the Wall Street Journal. At that time, there were 9 railroad stocks and 2 industrial stocks in the index. In 1884, the railroads were the largest and most stable companies. The stocks of industrial companies were considered speculative investments. In 1896, Charles Dow introduced an index for industrial stocks and the original Dow average became a railroad stock index. More companies were added to the industrial index until 1928, when the number was increased to 30.

The Dow Jones Industrial Average uses a divisor to adjust for events that result in no change in a company's value but that would otherwise influence the index. One such event is a stock split; another is the replacement of one company in the index by another. While this adustment does not result in a change in the index value when a stock splits, because the index is price-weighted the newly split stock will have a lower price and therefore less influence on the index.

Dow Jones Transportation Average

The Dow Jones Transportation Average is a price-weighted index. It originated from the index of 9 railroad stocks and 2 industrial stocks that Dow Jones & Co. introduced in 1884. In 1896 when the original index became the Dow Jones Railroad Average the industrial stocks were removed from it. Later, the Railroad Average was renamed to the Transportation Average. In addition to railroads, today the average includes other transportation stocks such as airlines and trucking companies.

Dow Jones Utility Average

The Dow Jones Utility Average is a price-weighted index of 15 utility stocks, especially electric utilities and gas utilities. It was created in 1929 with 18 stocks, was increased to 20 stocks six months later, then reduced to 15 stocks in 1938.

Nasdaq Composite Index

The Nasdaq Composite Index is a market capitalization weighted index of more than 5000 stocks. Comprising all Nasdaq-listed common stocks, it is the most commonly used index for tracking the Nasdaq.

Russell 2000

The Russell 2000 is a market capitalization weighted index. It was created in 1984 by the Frank Russell Company. The Russell universe of stocks covers 3000 companies, and the Russell 2000 represents the smallest two-thirds of those companies. As such, it is a small-cap index.

S&P 100

The S&P 100 is a market capitalization weighted index of large-cap companies. This index also is known by its ticker symbol, OEX. It comprises 100 large blue-chip companies across a wide range of industries.

S&P 500

The S&P 500 is a market cap weighted index of large-cap companies from a variety of industries. It includes industrial, utility, transportation, and financial stocks. The S&P 500 is widely used as a benchmark by institutional investors.

Value Line Composite Index

The Value Line Composite Index is a broad, unweighted index of approximately 1700 companies covered in the Value Line Investment Survey.

Wilshire 5000

The Wilshire 5000 is a market capitalization weighted index. It was created by Wilshire Associates in 1974. It is the broadest index, including virtually every actively traded U.S. stock.

TRADING COSTS

The cost associated with trading securities can have a non-negligible impact on portfolio return. Trading costs include the following:

- Explicit costs - commissions, fees, and taxes.
- Market maker spread - difference between the bid and ask prices that the specialist sets for a stock; the specialist keeps the difference as compensation for providing immediacy. For less liquid stocks, the specialist has greater exposure to adverse price movements and likely will make the spread larger.
- Market impact - results when high volume trades influence the market price. Market impact can be broken into two components - a temporary one and a permanent one. The temporary component is due to the need for liquidity to fill the order. The permanent impact is due to the change in the market's perception of the security as a result of the block trade.
- Opportunity cost - the effective cost of price movements that occur before the trade executes.

NYSE specialists sometimes may appear to have a monopoly on trading their respective securities, creating a larger than necessary spread between bid and ask. However, there is more competition than is initially obvious. First, there is competition for the specialist positions, providing the specialist incentive to price fairly. Furthermore, there are other specialists on the floor who may be willing to trade within the spread if it is too wide.

The total trading cost of a buy transaction is calculated by taking the percentage increase of the average purchase price as compared to the price when the buy decision was made, and adding the commissions, fees, and taxes as a percentage of the price when the buy decision was made.

Active portfolio managers attempt to outperform passive benchmarks, but trading costs reduce any realized advantages. Typical trading commissions run 0.20% of the transaction amount, and the typical cost due to bid-ask spread and market impact is 0.55%. The total cost of a trade then is 0.75% of the trade amount. If a fund has a portfolio turnover rate of 80%, and for every sell transaction the stock is replaced via a buy transaction, a total of 160% of the portfolio value will be transacted each year. For trading costs of 0.75% per transaction, the annual trading costs amount to (1.6)(0.75%) = 1.20% of the portfolio value. If one adds a 0.3% management fee to this amount, the total becomes 1.50%.

Reducing Trading Costs: Passively Traded Funds

Passive portfolios have lower transaction costs and overall trading costs. The transaction cost is typically 0.25% of the transaction value, since a passive portfolio does not have to trade as quickly and can be more patient with each transaction. A typical turnover rate for a passive portfolio is about 4% per year, and assuming replacement 8% of the portfolio

value will be transacted each year for annual trading costs of only (0.08)(0.25%) = 0.02% of the portfolio value. Passive portfolios have lower management fees, for example, 0.10%, so the total of trading costs and management fees is only 0.12%, compared to 1.50% for a typical actively managed fund.

Passively managed funds that track an index often have returns less than that of the index because of trading costs, especially for small-cap indices in which the securities are less liquid. These trading costs can be reduced if the weights of the securities in the fund are allowed to deviate somewhat from the index, since both trading volume and the need for immediacy are reduced. The correlation with the index still can remain quite high under the relaxed weights.

In 1982 Dimensional Fund Advisors (DFA) introduced a passive small-cap "9-10" fund composed of the lower two deciles of NYSE market capitalization. The fund sacrificed tracking accuracy by allowing the weights to deviate in order to minimize trading costs. The result was higher performance than other small-cap funds. The 9-10 fund even outperformed the stocks in the lower two market capitalization deciles of the NYSE, partly due to the following strategies:

1. The 8th decile is treated as a hold range, not a sell range,
2. The DFA waits a minimum of one year before buying IPO's,
3. The fund does not buy stocks selling for less than $2 or having less than $10 million in market capitalization,
4. The fund does not buy NASDAQ stocks having fewer than four market makers,
5. The fund does not buy bankrupt stocks, and
6. The fund is passive, not rigidly indexed.

Note that using the 8th decile as a hold range effectively increases the average market cap of the portfolio and increases returns in periods in which large caps outperform small caps, such as in the 1980's.

Reducing Trading Costs: Electronic Trading

Electronic crossing networks have lower trading costs than do exchanges because of lower commissions, no bid-ask spread, and elimination of market impact. By matching the natural buyers and sellers of a security at some predetermined price, for example, the NYSE closing price, electronic crossing networks eliminate the need for a market maker to provide liquidity. However, crossing networks require buyers and sellers to participate in order for there to be liquidity. Furthermore, there are the disadvantages of potentially limited liquidity and no inherent price discovery mechanism.

Electronic communications networks are computerized bulletin boards for matching trades. Because the traders can remain anonymous, price impact is diminished.

Another electronic trading mechanism is the single-price call auction in which buyers and sellers simply place limit orders. The market clearing price is set at the intersection of the supply and demand curves.

MARKET TIMING

Some investment managers and individual investors attempt to improve their performance by timing the market and adjusting their portfolio according to predictions about the market or specific sectors. Examples of market timing include switching among sectors, switching among different countries' securities, switching between stocks and bonds, or switching between stocks and risk-free treasury bills. The effect of correctly timing the market would be to increase the portfolio beta in up markets and decrease it in down markets. For the purpose of this discussion, an up market is one in which the market return exceeds the risk-free rate, and a down market is one in which the market return is less than the risk-free rate.

Proponents of market timing may argue that the market timer does not have to be correct 100% of the time in order to benefit from timing. Some even may argue that for market timing to be worthwhile, the timer simply must be right more often than wrong.

Opponents to market timing may argue that the financial markets are fairly efficient, and therefore there is little to be gained from attempting to time them. Furthermore, there are transaction costs and tax implications associated with buying and selling stocks, both of which create an inherent disadvantage for the market timer. Finally, opponents of market timing may argue that no market timer can be correct 100% of the time, and the lost opportunity caused by missing a bull market or the significant losses of getting caught in a bear market require much more than 50% of a market timer's predictions to be correct in order to benefit from the strategy.

One can test this argument by creating a model to determine how accurate the market timer's predictive ability must be in order to benefit from the strategy. William Sharpe provided such a framework for evaluating the potential of market timing in his 1975 publication "Likely Gains from Market Timing". The potential gains from market timing can be modeled by considering an investor who switches between 100% equity and 100% cash equivalents invested at the risk-free rate. The goal is to determine what the probability of correctly predicting up or down markets must be in order to make timing worthwhile. Define:

$$\pi up = \text{probability of an up market}$$

$$\pi down = \text{probability of a down market}$$

$$pcorrect = \text{probability of correctly predicting an up or down market}$$

where an up market is defined as the situation in which stock returns exceed the risk-free rate in the period under consideration. Historically,

$$\pi up = 67\% \quad \text{and} \quad \pi down = 33\%$$

One then can draw a tree that leads to four outcomes:

1. Up market, predicted up. [probability = πuppcorrect]
2. Up market, predicted down. [probability = πup(1 – pcorrect)]
3. Down market, predicted up. [probability = πdown(1 – pcorrect)]
4. Down market, predicted down. [probability = πdownpcorrect]

Using historical market data from 1934 to 1972 and analyzing returns assuming various levels of predictive ability, the result is that in order to perform better than simply remaining fully invested in stocks, one must be able to predict the market with at least 83% accuracy, a predictive ability that would be extremely difficult for even the best market timer to sustain.

However, this comparison has not considered risk - staying fully invested at all times results in more portfolio variance. The market timer is not invested in stocks 100% of the time, and therefore experiences less variability in portfolio return. To make a fair comparison, one must adjust for the differences in risk. If one compares the market timer's return to that of a portfolio of stocks and cash weighted to have the same standard deviation as the market timer's portfolio, the result is that the market timer must be correct 74% of the time in order to perform better than the passive portfolio of the same risk. So even after adjusting for risk, a significant predictive ability still is required.

One can evaluate the success or failure of a portfolio manager's market timing strategy by performing the following regression:

$$Rpt - RFt = a + b(Rmt - RFt) + c(Rmt - RFt)2 + ept$$

where Rp is the portfolio return, RF is the risk-free rate, Rm is the market return. If the value of c is greater than zero, than some ability to time the market has been demonstrated. An alternative method is to perform the following regression:

$$Rpt - RFt = a + b(Rmt - RFt) + c[(Rmt - RFt)Dt] + upt$$

In this regression, Dt = 1 if Rmt > RFt, 0 otherwise. If the value of c is greater than zero, than some ability to time the market has been demonstrated. Using this equation, b is the beta in down markets, b+c is the beta in up markets, and c is the difference in the up market and down market betas.

PROJECT MANAGEMENT

- calculate whether to do it or not
  - NPV
  - IRR
  - Payback Period
  -

Total Quality Management
Continuous Quality Improvement

MARKETING MANAGEMENT

- strategy
- cannot modify cost, market share and brand equity at same time

MARKETING PLAN OUTLINE

I. Executive Summary

A high-level summary of the marketing plan.

II. The Challenge

Brief description of product to be marketed and associated goals, such as sales figures and strategic goals.

III. Situation Analysis

Company Analysis
- Goals
- Focus
- Culture
- Strengths
- Weaknesses
- Market share

Customer Analysis
- Number
- Type
- Value drivers
- Decision process
- Concentration of customer base for particular products

Competitor Analysis
- Market position
- Strengths
- Weaknesses
- Market shares

Collaborators
- Subsidiaries, joint ventures, and distributors, etc.

Climate

Macro-environmental PEST analysis :

- Political and legal environment
- Economic environment
- Social and cultural environment
- Technological environment

SWOT Analysis

A SWOT analysis of the business environment can be performed by organizing the environmental factors as follows:

- The firm's internal attributes can be classed as strengths and weaknesses.
- The external environment presents opportunities and threats.

IV. Market Segmentation

Present a description of the market segmentation as follows:

Segment 1

- Description
- Percent of sales
- What they want
- How they use product
- Support requirements
- How to reach them
- Price sensitivity

Segment 2

.
.
.

V. Alternative Marketing Strategies

List and discuss the alternatives that were considered before arriving at the recommended strategy. Alternatives might include discontinuing a product, re-branding, positioning as a premium or value product, etc.

VI. Selected Marketing Strategy

Discuss why the strategy was selected, then the marketing mix decisions (4 P's) of product, price, place (distribution), and promotion.

Product

The product decisions should consider the product's advantages and how they will be leveraged. Product decisions should include:

- Brand name
- Quality
- Scope of product line
- Warranty
- Packaging
- Price

Discuss pricing strategy, expected volume, and decisions for the following pricing variables:

- List price
- Discounts
- Bundling
- Payment terms and financing options
- Leasing options
- Distribution (Place)

Decision variables include:

- Distribution channels, such as direct, retail, distributors & intermediates
- Motivating the channel - for example, distributor margins
- Criteria for evaluating distributors
- Locations
- Logistics, including transportation, warehousing, and order fulfilment
- Promotion

Advertising, including how much and which media.

- Public relations
- Promotional programs
- Budget; determine break-even point for any additional spending
- Projected results of the promotional programs

VII. Short & Long-Term Projections

The selected strategy's immediate effects, expected long-term results, and any special actions required to achieve them. This section may include forecasts of revenues and expenses as well as the results of a break-even analysis.

VIII. Conclusion

Summarize all of the above.

Appendix

Exhibits

Calculations of market size, commissions, profit margins, break-even analyses, etc.

THE MARKETING MIX

The major marketing management decisions can be classified in one of the following four categories:

- Product
- Price
- Place (distribution)
- Promotion

These variables are known as the marketing mix or the 4 P's of marketing. They are the variables that marketing managers can control in order to best satisfy customers in the target market. The marketing mix is portrayed in the following diagram:

The firm attempts to generate a positive response in the target market by blending these four marketing mix variables in an optimal manner.

Product

The product is the physical product or service offered to the consumer. In the case of physical products, it also refers to any services or conveniences that are part of the offering.

Product decisions include aspects such as function, appearance, packaging, service, warranty, etc.

Price

Pricing decisions should take into account profit margins and the probable pricing response of competitors. Pricing includes not only the list price, but also discounts, financing, and other options such as leasing.

Place

Place (or placement) decisions are those associated with channels of distribution that serve as the means for getting the product to the target customers. The distribution system performs transactional, logistical, and facilitating functions.

Distribution decisions include market coverage, channel member selection, logistics, and levels of service.

Promotion

Promotion decisions are those related to communicating and selling to potential consumers. Since these costs can be large in proportion to the product price, a break-even analysis should be performed when making promotion decisions. It is useful to know the value of a customer in order to determine whether additional customers are worth the cost of acquiring them.

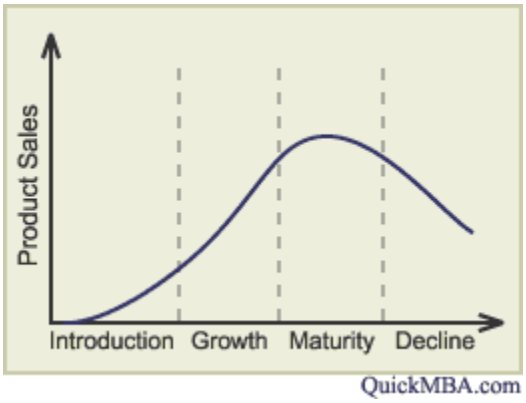
Promotion decisions involve advertising, public relations, media types, etc.

THE PRODUCT LIFE CYCLE

A new product progresses through a sequence of stages from introduction to growth, maturity, and decline. This sequence is known as the product life cycle and is associated with changes in the marketing situation, thus impacting the marketing strategy and the marketing mix.

The product revenue and profits can be plotted as a function of the life-cycle stages as shown in the graph below:

Product Life Cycle Diagram



Introduction Stage

In the introduction stage, the firm seeks to build product awareness and develop a market for the product. The impact on the marketing mix is as follows:

Product branding and quality level is established, and intellectual property protection such as patents and trademarks are obtained.

Pricing may be low penetration pricing to build market share rapidly, or high skim pricing to recover development costs.

Distribution is selective until consumers show acceptance of the product.

Promotion is aimed at innovators and early adopters. Marketing communications seeks to build product awareness and to educate potential consumers about the product.

Growth Stage

In the growth stage, the firm seeks to build brand preference and increase market share.

Product quality is maintained and additional features and support services may be added.

Pricing is maintained as the firm enjoys increasing demand with little competition.

Distribution channels are added as demand increases and customers accept the product.

Promotion is aimed at a broader audience.

Maturity Stage

At maturity, the strong growth in sales diminishes. Competition may appear with similar products. The primary objective at this point is to defend market share while maximizing profit.

Product features may be enhanced to differentiate the product from that of competitors.

Pricing may be lower because of the new competition.

Distribution becomes more intensive and incentives may be offered to encourage preference over competing products.

Promotion emphasizes product differentiation.

Decline Stage

As sales decline, the firm has several options:

Maintain the product, possibly rejuvenating it by adding new features and finding new uses.

Harvest the product - reduce costs and continue to offer it, possibly to a loyal niche segment.

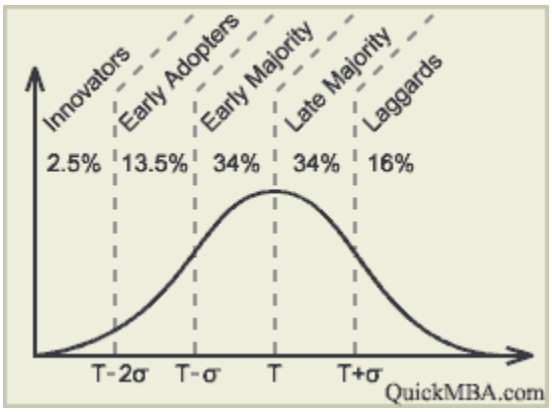
Discontinue the product, liquidating remaining inventory or selling it to another firm that is willing to continue the product.

The marketing mix decisions in the decline phase will depend on the selected strategy. For example, the product may be changed if it is being rejuvenated, or left unchanged if it is being harvested or liquidated. The price may be maintained if the product is harvested, or reduced drastically if liquidated.

PRODUCT DIFFUSION CURVE

Consumers can be grouped according to how quickly they adopt a new product. On the one extreme, some consumers adopt the product as soon as it becomes available. On the other extreme, some consumers are among the last to purchase a new product. As a whole, the new product adoption process can be modeled in the form of a bell-shaped diffusion curve similar to the following:

New Product Diffusion Curve



Defining bins one standard deviation wide about the mean, five different product adoption groups can be defined:

- Innovators - well-informed risk-takers who are willing to try an unproven product. Innovators represent the first 2.5% to adopt the product.
- Early adopters - based on the positive response of innovators, early adopters then begin to purchase the product. Early adopters tend to be educated opinion leaders and represent about 13.5% of consumers.
- Early majority - careful consumers who tend to avoid risk, the early majority adopts the product once it has been proven by the early adopters. They rely on recommendations from others who have experience with the product. The early majority represents 34% of consumers.
- Late majority - somewhat skeptical consumers who acquire a product only after it has become commonplace. The late majority represents about 34% of consumers.
- Laggards - those who avoid change and may not adopt a new product until traditional alternatives no longer are available. Laggards represent about 16% of consumers.

For this discussion, the term "consumers" represents both individuals and organizations.

The rate of adoption depends on many factors, including:

- perceived benefits over alternative products

- communicability of the product benefits
- price and ongoing costs
- ease of use
- promotional effort
- distribution intensity
- perceived risk
- compatibility with existing standards and values
- divisibility (the extent to which a new product can be tested on a limited basis)

Even if a product offers high value to the customer, the firm nonetheless faces the challenge of convincing potential customers to try the product and eventually to adopt it. The product diffusion curve is partly responsible for the product life cycle, which calls for different management strategies that depend on the product's stage in the life cycle.

POSITIONING

As Popularized by Al Ries and Jack Trout

In their 1981 book, Positioning: The Battle for your Mind, Al Ries and Jack Trout describe how positioning is used as a communication tool to reach target customers in a crowded marketplace. Jack Trout published an article on positioning in 1969, and regular use of the term dates back to 1972 when Ries and Trout published a series of articles in Advertising Age called "The Positioning Era." Not long thereafter, Madison Avenue advertising executives began to develop positioning slogans for their clients and positioning became a key aspect of marketing communications.

Positioning: The Battle for your Mind has become a classic in the field of marketing. The following is a summary of the key points made by Ries and Trout in their book.

Information Overload

Ries and Trout explain that while positioning begins with a product, the concept really is about positioning that product in the mind of the customer. This approach is needed because consumers are bombarded with a continuous stream of advertising, with advertisers spending several hundred dollars annually per consumer in the U.S. The consumer's mind reacts to this high volume of advertising by accepting only what is consistent with prior knowledge or experience.

It is quite difficult to change a consumer's impression once it is formed. Consumers cope with information overload by oversimplifying and are likely to shut out anything inconsistent with their knowledge and experience. In an over-communicated environment, the advertiser should present a simplified message and make that message consistent with what the consumer already believes by focusing on the perceptions of the consumer rather than on the reality of the product.

Getting Into the Mind of the Consumer

The easiest way of getting into someone's mind is to be first. It is very easy to remember who is first, and much more difficult to remember who is second. Even if the second entrant offers a better product, the first mover has a large advantage that can make up for other shortcomings.

However, all is not lost for products that are not the first. By being the first to claim a unique position in the mind the consumer, a firm effectively can cut through the noise level of other products. For example, Miller Lite was not the first light beer, but it was the first to be positioned as a light beer, complete with a name to support that position. Similarly, Lowenbrau was the most popular German beer sold in America, but Beck's Beer successfully carved a unique position using the advertising,

"You've tasted the German beer that's the most popular in America. Now taste the German beer that's the most popular in Germany."

Consumers rank brands in their minds. If a brand is not number one, then to be successful it somehow must relate itself to the number one brand. A campaign that pretends that the market leader does not exist is likely to fail. Avis tried unsuccessfully for years to win customers, pretending that the number one Hertz did not exist. Finally, it began using the line,

"Avis in only No. 2 in rent-a-cars, so why go with us? We try harder."

After launching the campaign, Avis quickly became profitable. Whether Avis actually tried harder was not particularly relevant to their success. Rather, consumers finally were able to relate Avis to Hertz, which was number one in their minds.

Another example is that of the soft-drink 7-Up, which was No. 3 behind Coke and Pepsi. By relating itself to Coke and Pepsi as the "Uncola", 7-Up was able to establish itself in the mind of the consumer as a desirable alternative to the standard colas.

When there is a clear market leader in the mind of the consumer, it can be nearly impossible to displace the leader, especially in the short-term. On the other hand, a firm usually can find a way to position itself in relation to the market leader so that it can increase its market share. It usually is a mistake, however, to challenge the leader head-on and try to displace it.

Positioning of a Leader

Historically, the top three brands in a product category occupy market share in a ratio of 4:2:1. That is, the number one brand has twice the market share of number two, which has twice the market share of number three. Ries and Trout argue that the success of a brand is not due to the high level of marketing acumen of the company itself, but rather, it is due to the fact that the company was first in the product category. They use the case of Xerox to make this point. Xerox was the first plain-paper copier and was able to sustain its leadership position. However, time after time the company failed in other product categories in which it was not first.

Similarly, IBM failed when it tried to compete with Xerox in the copier market, and Coca-Cola failed in its effort to use Mr. Pibb to take on Dr. Pepper. These examples support the point that the success of a brand usually is due to its being first in the market rather than the marketing abilities of the company. The power of the company comes from the power of its brand, not the other way around.

With this point in mind, there are certain things that a market leader should do to maintain the leadership position. First, Ries and Trout emphasize what it should not do, and that is boast about being number one. If a firm does so, then customers will think that the firm is insecure in its position if it must reinforce it by saying so.

If a firm was the first to introduce a product, then the advertising campaign should reinforce this fact. Coca-Cola's "the real thing" does just that, and implies that other colas are just imitations.

Another strategy that a leader can follow to maintain its position is the multibrand strategy. This strategy is to introduce multiple brands rather than changing existing ones that hold leadership positions. It often is easier and cheaper to introduce a new brand rather than change the positioning of an existing brand. Ries and Trout call this strategy a single-position strategy because each brand occupies a single, unchanging position in the mind of the consumer.

Finally, change is inevitable and a leader must be willing to embrace change rather than resist it. When new technology opens the possibility of a new market that may threaten the existing one, a successful firm should consider entering the new market so that it will have the first-mover advantage in it. For example, in the past century the New York Central Railroad lost its leadership as air travel became possible. The company might have been able to maintain its leadership position had it used its resources to form an airline division.

Sometimes it is necessary to adopt a broader name in order to adapt to change. For example, Haloid changed its name to Haloid Xerox and later to simply Xerox. This is a typical pattern of changing Name 1 to an expanded Name 1 - Name 2, and later to just Name 2.

Positioning of a Follower

Second-place companies often are late because they have chosen to spend valuable time improving their product before launching it. According to Ries and Trout, it is better to be first and establish leadership.

If a product is not going to be first, it then must find an unoccupied position in which it can be first. At a time when larger cars were popular, Volkswagen introduced the Beetle with the slogan "Think small." Volkswagen was not the first small car, but they were the first to claim that position in the mind of the consumer.

Other positions that firms successfully have claimed include:

- age (Geritol)
- high price (Mobil 1 synthetic engine lubricant)
- gender (Virginia Slims)
- time of day (Nyquil night-time cold remedy)
- place of distribution (L'eggs in supermarkets)
- quantity (Schaefer - "the one beer to have when you're having more than one.")

It most likely is a mistake to build a brand by trying to appeal to everyone. There are too many brands that already have claimed a position and have become entrenched leaders in their positions. A product that seeks to be everything to everyone will end up being nothing to everyone.

Repositioning the Competition

Sometimes there are no unique positions to carve out. In such cases, Ries and Trout suggest repositioning a competitor by convincing consumers to view the competitor in a different way. Tylenol successfully repositioned aspirin by running advertisements explaining the negative side effects of aspirin.

Consumers tend to perceive the origin of a product by its name rather than reading the label to find out where it really is made. Such was the case with vodka when most vodka brands sold in the U.S. were made in the U.S. but had Russian names. Stolichnaya Russian vodka successfully repositioned its Russian-sounding competitors by exposing the fact that they all actually were made in the U.S., and that Stolichnaya was made in Leningrad, Russia.

When Pringle's new-fangled potato chips were introduced, they quickly gained market share. However, Wise potato chips successfully repositioned Pringle's in the mind of consumers by listing some of Pringle's non-natural ingredients that sounded like harsh chemicals, even though they were not. Wise potato chips of course, contained only "Potatoes. Vegetable oil. Salt." As a resulting of this advertising, Pringle's quickly lost market share, with consumers complaining that Pringle's tasted like cardboard, most likely as a consequence of their thinking about all those unnatural ingredients. Ries and Trout argue that is usually is a lost cause to try to bring a brand back into favor once it has gained a bad image, and that in such situations it is better to introduce an entirely new brand.

Repositioning a competitor is different from comparative advertising. Comparative advertising seeks to convince the consumer that one brand is simply better than another. Consumers are not likely to be receptive to such a tactic.

The Power of a Name

A brand's name is perhaps the most important factor affecting perceptions of it. In the past, before there was a wide range of brands available, a company could name a product just about anything. These days, however, it is necessary to have a memorable name that conjures up images that help to position the product.

Ries and Trout favor descriptive names rather than coined ones like Kodak or Xerox. Names like DieHard for a battery, Head & Shoulders for a shampoo, Close-Up for a toothpaste, People for a gossip magazine. While it is more difficult to protect a generic name under trademark law, Ries and Trout believe that in the long run it is worth the effort and risk. In their opinion, coined names may be appropriate for new products in

which a company is first to market with a sought-after product, in which case the name is not so important.

Margarine is a name that does not very well position the product it is describing. The problem is that it sounds artificial and hides the true origin of the product. Ries and Trout propose that "soy butter" would have been a much better name for positioning the product as an alternative to the more common type of butter that is made from milk. While some people might see soy in a negative light, a promotional campaign could be developed to emphasize a sort of "pride of origin" for soy butter.

Another everyday is example is that of corn syrup, which is viewed by consumers as an inferior alternative to sugar. To improve the perceptions of corn syrup, one supplier began calling it "corn sugar", positioning it as an alternative to cane sugar or beet sugar.

Ries and Trout propose that selecting the right name is important for positioning just about anything, not just products. For example, the Clean Air Act has a name that is difficult to oppose, as do "fair trade" laws. Even a person's name impacts his or her success in life. One study showed that on average, schoolteachers grade essays written by children with names like David and Michael a full letter grade higher than those written by children with names like Hubert and Elmer.

Eastern Airlines was an example of a company limited by its name. Air travel passengers always viewed it as a regional airline that served the eastern U.S., even though it served a much wider area, including the west coast. Airlines such as American and United did not have such a perception problem. (Eastern Airlines ceased operations in 1991.)

Another problem that some companies face is confusion with another company that has a similar name. Consumers frequently confused the tire manufacturer B.F. Goodrich with Goodyear. The Goodyear blimp had made Goodyear tires well-known, and Goodyear frequently received credit by consumers for tire products that B.F. Goodrich has pioneered. (B.F. Goodrich eventually sold its tire business to Uniroyal.)

Other companies have changed their names to something more general, and as a result create confusion with other similar-sounding companies. Take for instance The Continental Group, Inc. and The Continental Corporation. Few people confidently can say which makes cans and which sells insurance.

The No-Name Trap

People tend use abbreviations when they have fewer syllables than the original term. GE is often used instead of General Electric. IBM instead of International Business Machines. In order to make their company names more general and easier to say, many corporations have changed their legal names to a series of two or three letters. Ries and Trout argue that such changes usually are unwise.

Companies having a broad recognition may be able to use the abbreviated names and consumers will make the translation in their minds. When they hear "GM", they think "General Motors". However, lesser known companies tend to lose their identity when they use such abbreviations. Most people don't know the types of business in which companies named USM or AMP are engaged.

The same applies to people's names as well. While some famous people are known by their initials (such as FDR and JFK), it is only after they become famous that they begin using their initials. Ries and Trout advise managers who aspire for name recognition to use an actual name rather then first and middle initials. The reason that initials do not lead to recognition is that the human mind works by sounds, not by spellings.

Most companies began selling a single product, and the name of the company usually reflected that product. As the successful firms grew in to conglomerates, their original names became limiting. Ries and Trout advise companies seeking more general names to select a shorter name made of words, not individual letters. For example, for Trans World Airlines, they favored truncating it simply to Trans World instead removing all words and using the letters TWA.

The Free-Ride Trap

A company introducing a new product often is tempted to use the brand name of an existing product, avoiding the need to build the brand from scratch. For example, Alka-Seltzer named a new product Alka-Seltzer Plus. Ries and Trout do not favor this strategy since the original name already in positioned in the consumer's mind. In fact, consumers viewed Alka-Seltzer Plus simply as a better Alka-Seltzer, and the sales of Alka-Seltzer Plus came at the expense of Alka-Seltzer, not from the market share of the competition.

Some firms have built a wide range of products on a single brand name. Others, such as Procter & Gamble have selected new names for each new product, carefully positioning the product in a different part of the consumer's mind. Ries and Trout maintain that a single brand name cannot hold multiple positions; either the new product will not be successful or the original product bearing the name will lose its leadership position.

Nonetheless, some companies do not want their new products to be anonymous with an unrecognized name. However, Ries and Trout propose that anonymity is not so bad; in fact, it is a resource. When the product eventually catches the attention of the media, it will have the advantage of being seen without any previous bias, and if a firm prepares for this event well, once under the spotlight the carefully designed positioning can be communicated exactly as intended. This moment of fame is a one-shot event and once it has passed, the product will not have a second chance to be fresh and new.

The Line Extension Trap

Line extensions are tempting for companies as a way to leverage an existing popular brand. However, if the brand name has become near generic so that consumers consider

the name and the product to be one and the same, Ries and Trout generally do not believe that a line extension is a good idea.

Consider the case of Life Savers candy. To consumers, the brand name is synonymous with the hard round candy that has a hole in the middle. Nonetheless, the company introduced a Life Savers chewing gum. This use of the Life Savers name was not consistent with the consumer's view of it, and the Life Savers chewing gum brand failed. The company later introduced the first brand of soft bubble gum and gave it a new name: Bubble Yum. This product was very successful because it not only had a name different from the hard candy, it also had the the advantage of being the first soft bubble gum.

Ries and Trout cite many examples of failures due to line extensions. The consistent pattern in these cases is that either the new product does not succeed, or the original successful product loses market share as a result of its position being weakened by a diluted brand name.

When Line Extensions Can Work

Despite the disadvantages of line extensions, there are some cases in which it is not economically feasible to create a new brand and in which a line extension might work. Some of the cases provided by Ries and Trout include:

- Low volume product - if the sales volume is not expected to be high.
- Crowded market - if there is no unique position that the product can occupy.
- Small ad budget - without strong advertising support, it might make sense to use the house name.
- Commodity product - an undifferentiated commodity product has less need of its own name than does a breakthrough product.
- Distribution by sales reps - products distributed through reps may not need a separate brand name. Those sold on store shelves benefit more from their own name.

Positioning Has Broad Applications

The concept of positioning applies to products in the broadest sense. Services, tourist destinations, countries, and even careers can benefit from a well-developed positioning strategy that focuses on a niche that is unoccupied in the mind of the consumer or decision-maker.

MARKETING WARFARE

The marketing concept states that a firm's goal should be to identify and profitably satisfy customer needs. In Marketing Warfare Al Ries and Jack Trout argue that marketing is war and that the marketing concept's customer-oriented philosophy is inadequate. Rather, firms would do better by becoming competitor-oriented. If the key to success were to introduce products closest to those wanted by customers, then the market leader simply would be the firm that performed the best market research. Clearly, much more is required.

To illustrate their point, Ries and Trout compare marketing to a football game. If a team simply identifies the goal line and moves the ball towards it without regard to the competing team, they most likely will be blocked in their effort. To win the game, the team must focus its efforts on outwitting, outflanking, or over-powering the other side. This is the case in football, war, and marketing, according to Marketing Warfare. Because of the importance of the competition faced by the firm, a good marketing plan should include an extensive section on competitors.

2500 Years of War

There is much that marketers can learn from military strategy. Ries and Trout tell the story of several famous battles in history that illustrate lessons of warfare. These battles range from Marathon in 490 B.C. when the Greeks used the phalanx to defeat the more numerous Persian invaders, to the Normandy invasion of the second world war.

The lessons from these famous battles illustrate the concepts of planning, maneuvering, and overpowering the opposing side. These principles are relevant not only to warfare, but also to marketing. In Marketing Warfare, Ries and Trout quote Karl von Clausewitz and apply his principles to marketing.

The Principle of Force

There's a saying that it is easier to get to the top than to stay there. Ries and Trout disagree, arguing that once at the top, a company can use the power of its leadership position to stay there.

All other things equal, an army with a larger number of troops has an advantage over smaller armies. A larger vehicle has an advantage over a smaller vehicle in a collision. When several companies enter a new market, the one with the larger sales force is likely to become the leader. The larger company has the resources to outnumber smaller competitors. It can advertise more, perform more R&D, open more sales outlets, etc.

This is not to say that smaller companies do not stand a chance. Rather, smaller companies must recognize the principle of force and attempt to win the battle by means of a superior strategy, not by brute force.

Some managers may believe that they can overcome a larger competitor through superior employees. Ries and Trout maintain that while it may be possible to assemble a small group of star performers, on a larger scale the employee abilities will approach the mean.

Another argument is that a better product will overcome other weaknesses. Again, Ries and Trout disagree. Once consumers already have in their minds that a product is number one, it is extremely difficult for another product, even if superior, to take over that number one place in the consumer's mind.

The way to win the battle is not to recruit superior employees or to develop a superior product. Rather, Ries and Trout argue that to win the battle, a firm must successfully execute a superior strategy.

The Superiority of the Defense

An entrenched defense that is expecting an attack has an advantage that can only be overcome by an overwhelmingly larger attacker. For example, a defensive position that is in a trench or foxhole will be shielded from the attackers, and the attackers will suffer many more casualties than the defenders. For this reason, the attackers require a much larger force to overcome the defensive positions.

The same is true in marketing warfare. Many companies with insufficient resources have tried unsuccessfully to attack a leader. A study was made of 25 brands that held the number one position. Sixty years later, 20 of those 25 brands still held the number one position. It is very difficult to overtake the market leader.

The element of surprise helps the attacker, but when the market leader is large the attackers also must be large, and the logistics of launching a large scale attack or a large promotional campaign are such that the element of surprise is difficult to maintain and the defensive position becomes yet more difficult to upset. When the defenders are taken by surprise, it usually is because they ignored warnings or did not take them seriously.

The New Era of Competition

Increasingly, one hears marketing terms that are borrowed from the vocabulary of military strategy. From "launching a breakthrough campaign" to the "cola wars", the analogy between marketing and warfare is evident.

As in military strategy, it is unwise for a firm to publicly state deadlines for its victory. Deadlines often are missed, and the firm loses credibility in the propaganda war if it fails to live up to a prediction. Politicians who are wise to this rule tend to make their campaign promises vague. Publicly stated marketing promises should be vague for the same reason.

Firms also should avoid the trap of thinking that if they work hard enough, they will succeed in their attack. Ries and Trout argue that it is strategy and not hard work that determines success. In warfare, when a battle turns to hand-to-hand combat, the advantage resulting from the strategic plan no longer exists. In marketing, a firm achieves victory through a smarter strategy, not by spending longer hours with meetings, reports, memos, and management reviews. When management declares that it is time to "redouble our efforts", then the marketing battle has turned to hand-to-hand combat and is likely to end in defeat.

The Nature of the Battleground

In military warfare, a battle often is named after the geographic location where it took place - for example, The Battle of Waterloo. Ries and Trout argue that marketing battles do not take place in geographic areas, nor in stores. Rather, marketing battles take place in the mind of the consumer.

Before a military battle, the battlefield usually is mapped and studied in great detail. In marketing, market research traditionally has served this function. However, Ries and Trout propose that the most important information is to know which positions are held by which companies in the mind of the consumer. In other words, who holds the high ground.

In military warfare, mountains and higher altitude areas represent strong positions and often are used to present a strong defense. In marketing warfare, the question is one of who holds the mountains in the consumer's mind. For example, in the U.S., Kleenex holds the facial tissue mountain since it is the number one facial tissue in the minds of most consumers and many consumers consider the word "Kleenex" to be synonymous with facial tissue.

Mountains often are segmented and competitors may launch different brands each targeting a specific segment. General Motors successfully attacked Ford's market leadership when it launched Chevrolet, Pontiac, Oldsmobile, and Buick, each targeting a specific segment of the automobile market. Too often, the leader responds by attempting to counterattack in each segment, only to fail and even to lose its original leadership position.

The Strategic Square

Ries and Trout discuss four strategies for fighting a marketing war:

- defensive
- offensive
- flanking
- guerrilla

A firm's market share relative to that of competitors determines which strategy is appropriate. There often is a significant market share gap between two competitors such

that each has approximately a factor of two more market share compared to the next weaker competitor. Because of this large gap, the principle of force plays an important role in the choice of each firm's strategy. For this discussion, assume that there are four firms and each is approximately twice the size of the next closest to it.

In such an environment, each of the four firms has different objectives:

- Number 1 firm: market domination
- Number 2 firm: increased market share
- Number 3 firm: profitable survival
- Number 4 firm: survival

According to Ries and Trout, the main competitor of the market leader that holds the majority of market share is not one of the other firms in the industry, but rather, the government. If the market leader attempts to grow larger, then anti-trust issues will be raised. If a major market leader wins the marketing war and causes the next largest firm to exit the market, then the government may take steps to break up the firm that is dominating the market. Consequently, the best strategy for such a firm is a defensive one.

The number two firm's best strategy is an offensive attack on the market leader if there is a large gap between the number two firm and number three. The reason is that the gaining of market share from the number three firm is unlikely to make a large impact on the much larger number two firm. However, there are potentially significant rewards if market share can be gained from the dominant firm.

The number three firm is too small to sustain an offensive attack on a larger firm. Its best strategy often is to launch a flanking attack, avoiding direct competition, for example, by launching a product that is positioned differently from those of the larger firms.

The smallest firm probably does not have sufficient resources to launch any type of sustained attack. If it launched a flanking product, a larger competitor likely would launch a similar one and would have the resources to win more customers. The smallest firm would do best to pursue a guerrilla strategy, identifying a segment that is large enough to be interesting to the small firm but not large enough to attract competition from any of the larger firms.

On the mountains in the mind of the consumer (see The Nature of the Battleground discussed previously), the high ground at the top of the mountain is owned by the market leader. The number two firm's offensive battle would seek to gain high ground from the leader. The leader's defensive battle involves coming down from the top to fight off offensive attacks. The number three firm's flanking attack would go around the mountain. The smallest firm's guerrilla tactics involve its going under the mountain.

Principles of Defensive Warfare

A defensive strategy is appropriate for the market leader. Ries and Trout outline three basic principles of defensive marketing warfare:

1. Defensive strategies only should be pursued by the market leader. It is self-defeating for a firm to pretend that it is the market leader for the purpose strategy selection. The market leader is the firm who has attained that position in the mind of the consumer.
2. Attacking yourself is the best defensive strategy. Introducing products better than your existing ones preempts similar moves by the competition. Even if the new product has less profit margin and may reduce short-term profit, it accomplishes the more important long-term goal of protecting the firm's market share.
3. The leader always should block strong offensive moves made by competitors. If the leader fails to do so, the competitor may become entrenched and permanently maintain market share.

A classic example of a well-executed defensive block was that of Johnson & Johnson when Bristol-Meyers decided to launch Datril to compete directly with Johnson & Johnson's successful Tylenol brand. Datril was to be priced 35% lower than Tylenol.

Johnson & Johnson learned of Datril before its launch, and informed Bristol-Meyers that it was cutting the price of Tylenol to match that of Datril. Johnson & Johnson even extended credits to its distribution channels to make the price cut effective immediately. This move was intended to prevent Bristol-Meyers from advertising Datril as a lower-priced alternative to Tylenol. However, Bristol-Meyers responded by accelerating the launch of the television advertising campaign. Finally, Johnson & Johnson countered by convincing the television networks not to run the Datril ads since they no longer could truthfully claim that Datril was priced lower than Tylenol. Johnson & Johnson's efforts were successful and Datril achieved less than a 1% market share. Tylenol sales soared on the publicity and lower prices.

Legal issues are an important factor in a market leader's strategy. Successfully attacking the competition and winning raises anti-trust issues. Attacking oneself is less risky from an anti-trust perspective. It also is preferable to expand vertically rather than horizontally into new markets since laws prevent a firm from using its monopoly in one market to develop a competitive advantage in another.

Finally, once there is marketing peace and the brand has affirmed its dominance, it can grow its sales by growing the market. For example, Campbell's Soup can run ads to increase soup consumption in general (e.g. "Soup is good food.") since it enjoys such a large share of all soup sales.

Principles of Offensive Warfare

An offensive strategy is appropriate for a firm that is number 2 or possibly number 3 in the market. However, in some cases, no firms may be strong enough to challenge the leader with an offensive strategy. In such industries, the market leader should play a defensive strategy and the much smaller firms should play a flanking or guerrilla one.

Ries and Trout present the following three principles of offensive strategy:

1. The challenger's primary concern should be the strength of the leader's position, not the challenger's own strengths and weaknesses.
2. The challenger should seek a weakness in the leader's strength - not simply a weakness in the leader's position.
3. Attack on as narrow a front as possible. Avoid a broad attack.

The strength of the leader's position is of primary importance because the leader has the top position in the mind of the consumer, and it is this position that must be attacked.

A weakness in the leader's strength must be found. Simply attacking any weakness is insufficient. For example, the leader may charge a premium price and the price may appear to be a weakness. However, the leader may in fact have large profit margins and may be willing to lower the price as much as necessary to defend its position. The leader usually has the resources to defend against an attack against its weaknesses, whereas there may be weaknesses inherent in the leader's strengths that cannot be defended.

There often is a flip side to the leader's strength that can serve as the target of the challenger's attack. For example, a leader may be so successful that it is crowded with customers, and the challenger then can exploit that success by offering a better customer experience. For example, Avis Rent a Car once advertised, Rent from Avis. The line at our counter is shorter. Sometimes the weakness in the leader's strength arises from the fact that it has a major investment in assets that cannot be readily adapted. A more flexible challenger can use this fact to its advantage.

The challenger should attack on as narrow a front as possible. Generally, this means one product rather than a wide range of products. The reason for keeping the attack narrow is the principle of force; a narrow attack allows the challenger to concentrate its resources in the narrow area, and in that area may present more force than the leader. Many number two and number three companies ignore this principle and try to increase market share by broadening their product lines to compete in more areas, often with disastrous consequences. FedEx made this mistake in its early years by offering a wide array of transit times such as overnight, 2-day, and 3-day delivery. FedEx became successful only when it began to focus on the next-day delivery market and won that position in the mind of the consumer using the slogan, when it absolutely, positively has to be there overnight.

A narrow attack is particularly effective when the leader has attempted to be all things to all people with a single product. In that situation, a challenger can identify a segment within the leader's market and offer a product that serves only that segment. The challenger then stands a chance of winning a position in the consumer's mind for that more narrow class of product.

Principles of Flanking Warfare

A flanking attack is not a direct attack on the leader, but rather, an attack in an area where the leader has not established a strong position. Ries and Trout present the following three flanking principles:

1. A flanking move is best made in an uncontested area. The product should be in a new category that does not compete directly with the leader and should be the first to target the segment.
2. A flanking move should have an element of surprise. Surprise is important to prevent the leader from using its enormous resources to counter the move before it gains momentum. Test marketing should be minimized to maintain the element of surprise. In the earlier example of Datril vs. Tylenol, Johnson & Johnson first learned of the impending launch of Datril from Bristol-Meyers' localized test marketing of Datril.
3. Follow-through (pursuit) is equally as important as the attack itself. The firm should follow-through and focus on solidifying its position once it is established before competitors launch competing products. Too often, management turns its attention to the products that are not performing well rather than strengthening the position of the winners. If the firm does not have the resources to strengthen its newly won position, then perhaps it should have used a guerrilla strategy instead of a flanking one.

A flanking move does not require a totally new product. Instead, the product only needs to be different enough to carve its own position. Ries and Trout offer the following examples of product variations on which to base flanking moves:

- Low price - for example, Budget Rent a Car successfully flanked Hertz and Avis. Others such as Dollar and Thrifty followed, but Budget was ahead of the game and was able to solidify its position.
- High price - customers tend to use price as a measure of quality. Orville Redenbacher's Gourmet Popping Corn and Haagen-Daz super-premium ice cream are examples of products that successfully positioned themselves in the high-price category. The higher profit margins allow the firm to follow through and solidify its position.
- Small size - Sony with portable electronics and Volkswagen wth automobiles successfully won the position of small size. Volkswagen lost its position as it attempted to broaden its line to all sizes of cars.
- Large size - for example, the Prince oversized tennis racquet.
- Distribution - the product itself may not be substantially different but new distribution channels may be used. For example, Timex distributed its watches in drugstores and Hanes distributed L'eggs pantyhose in supermarkets using innovative packaging and displays.
- Product form - for example, Close-Up was the first gel toothpaste and Softsoap was the first liquid soap.

Flanking is not a low-risk strategy. Market acceptance of an innovative product is unknown, and test marketing must be kept to a minimum to guard the element of

surprise. Whether the leader will take prompt action in response is an unknown. Being well-tuned to the trade is helpful since in their public speeches executives often provide clues about their stances on potential products. For some products such as automobiles, the development time is several years and thus the flanking product has the potential to establish its position before incumbants can respond.

Principles of Guerrilla Warfare

Guerrilla marketing differs from a flanking campaign in that the guerrilla move is relatively small and differs significantly from the leader's position. Guerrilla marketing is appropriate for companies that, relative to the competition, are too small to launch offensive or flanking moves. Ries and Trout list the following three principles of guerrilla marketing warfare:

1. Identify a segment that is small enough to defend. For example, the scope can be limited geographically, demographically, by industry, or by price.
2. Never act like the leader, even if successful in the guerrilla attack. Some companies that make a guerrilla move are successful in it and begin to act like the leader, building a larger, bureaucratic organization that slows it down and increases overhead costs. A guerrilla should resist the temptation to give up its lean and nimble organization.
3. Be ready to enter or exit on short notice. If the market for the product takes a negative turn, the guerrilla should exit quickly rather than waste resources. Because the guerrilla has a nimble organization, it is better able to make a quick exit without suffering huge losses. Similarly, the guerrilla can respond more quickly to a market opportunity without spending months or years having committees analyze it. Guerrilla opportunities sometimes arise when a large company discontinues a product, leaving a gap on which the guerrilla firm can capitalize if it acts quickly.

The idea of guerrilla marketing is to direct resources into a limited area, using the principle of force to win that area.

Examples of geographic guerrillas include local retailers who win customers with offerings better tailored to the locale compared to the offerings of national chains. Locally-tailored city business publications are an example that fill a need that cannot be filled by a national publication such as the Wall Street Journal. Banks and airlines also have used a limited geographic scope successfully.

Demographic guerrillas target a specific demographic segment of the populuation. Inc. magazine is an example that targets small business owners who were not well served by publications such as Business Week.

Industry guerrillas target a specific industry, using vertical marketing to tailor a product to the special needs of that industry. The focus is narrow and deep rather than broad and shallow.

Product guerrillas offer a unique product for which there is a small market. The Jeep is an example of such a product.

High-end guerrillas offer a premium high-priced product. Rolls-Royce is a guerrilla in very high-priced automobiles. Because the volume is small and Rolls-Royce already has the lead, other manufacturers are deterred from competing directly. The high price creates a mystique about the product and raises the curiosity of consumers who seek to find out what makes the product so special that it commands such a high price. Line extensions of the main product do not work well here; high-end products should have a new name in order to establish a new position that is not diluted by the position of other products.

Alliances often are instrumental in a guerrilla strategy. In certain industries such as hotels, creating a brand that independents can join has been a successful strategy for many. A critical question when forming alliances is who the competitor is. Ries and Trout use the example of two motels across the street from one another on a resort island. On the surface it might appear that they are each other's competitors. Another way to view the situation is that they are allies attempting to attract tourists to their island rather than another resort island. An alliance might be more beneficial to the two motels than direct competition with one another.

For most companies, guerrilla marketing is the appropriate strategy simply because in most industries only a small percentage of firms are large enough to pursue defensive, offensive, or flanking strategies.

Marketing Warfare Case Studies

In Marketing Warfare, Ries and Trout include several cases to illustrate their strategic principles.

The "cola war" between Coke and Pepsi has been fought for decades. In 1915 Coca-Cola introduced its unique 6-1/2 ounce bottle that became closely associated with the brand. The size and shape was just right to fit the hand, and this bottle and its association with Coca-Cola was a major strength. However, when Pepsi introduced a larger bottle for the same price as the smaller bottle of Coke, Coke did not have many options to respond. Because of the way the size and shape of the bottle fit the hand, it could not be enlarged easily. Furthermore, the dispensing machines for Coke were designed for nickels only, so the price could not easily be changed. These weaknesses were a direct result of Coke's strength and illustrate the second principle of offensive warefare: the challenger should seek a weakness in the leader's strength. Many of the successes and failures of the Coke vs. Pepsi cola wars can be explained by principles of marketing warfare, including the success and failures of smaller challengers such as 7-Up (the Uncola) and Royal Crown Cola.

Ries and Trout also use the "beer war" to illustrate marketing warfare principles. Schlitz was the top brand, but lost its lead to Budweiser in a close battle. Then Heineken entered

the market as an import with a successful flanking attack, maintaining its import lead by following through with strong advertising budgets. In the 1970's many brewers introduced light beers as line extensions. Ries and Trout believe that the line extensions are unwise because the extensions inadvertantly flank a firm's own leading brand. This happened to Miller High Life after Miller Lite was introduced. Miller Lite was successful, but Miller High Life suffered as it lost its position in the mind of the consumer as the working man's beer.

In the fast food industry, Ries and Trout use the "burger war" to illustrate a flanking attack. McDonald's was the leader, and Burger King tried offensive maneuvers. The moves that were unsuccessful were those that extended the product line and that copied McDonald's. The campaigns that were successful differentiated Burger King from McDonald's. For example, Have it your way attacked a weakness in McDonald's consistent production line process that had the flip side of being inflexible. Even more successful were the advertisements emphasizing the fact that Burger King's burgers were flame-broiled while McDonald's were fried. Wendy's successfully flanked McDonald's by targeting adults rather than children, offering adult-size portions and launching the highly successful Where's the beef? campaign. Finally, White Castle was the low-end guerrilla who limited their geographic scope, did not add a confusing array of other products, and maintained a high level of sales in each establishment. White Castle observed the guerrilla principle of never acting like the leader, and as a result was able to coexist peacefully.

Ries and Trout further reinforce their marketing warfare principles with the "computer war". IBM became the market leader in the 1950's, and many other companies attempted to emulate IBM, but IBM continued to hold a majority market share. In the 1960's Digital Equipment Corporation launched a successful flanking attack by introducing the PDP-8 minicomputer, winning the position of small computers. According to Ries and Trout, IBM should have blocked this move by introducing their own minicomputer, but they failed to do so until 11 years later. With DEC owning the minicomputer market, Ries and Trout argue that DEC should have been the company to introduce the PC in the business market. DEC failed to do so, and IBM launched its PC in 1981 with virtually no competition in the business market. IBM effectively flanked DEC with a product in the small computer market, just as DEC had done to IBM 15 years earlier. Many companies introduced their own PC's but IBM pursued the defensive strategy that a leader should pursue by attacking itself, first with the improved PC-XT and then with the PC-AT. While IBM owned the business PC market, Apple took the lead in home PC's. IBM unsuccessfully attempted to attack Apple in the home computer market with the PCjr, illustrating that a company's position is more important than its size.

Strategy and Tactics

Strategy can be developed using a top-down or a bottom-up approach. Ries and Trout argue for the bottom-up approach because a deep knowledge of the tactics actually used on the battlefield is needed to formulate a strategy that has the goal of achieving tactical objectives. More specifically, Ries and Trout argue that the sole purpose of strategy is to

put the forces in motion to overpower the competitor at the point of contact using the principle of force. On the military battlefield, this means having more soldiers or force at the point of battle. On the marketing battlefield, it means overpowering the competitor in a specific position in the mind of the customer.

Ries and Trout explain that a good strategy does not depend on brilliant tactics. Mediocre tactics usually are sufficient for a good strategy. Even the best possible tactics are unlikely to compensate for a poor strategy. In marketing, advertising can be considered tactics and many managers falsely assume that success depends almost entirely on the quality of the advertising campaign. If a strategy requires top-notch tactics to win the battle, Ries and Trout maintain that such a strategy is unsound because tactical brilliance is rare.

Any strategy should take into account the probable response of the competitor. The best way to protect against a response is to attack the weakness in the leader's strength so that the leader cannot respond without giving up its strength.

To support the argument of a bottom-up strategy, Ries and Trout point out that many large companies incorrectly believe that they can do anything if they simply allocate enough resources. History shows otherwise when one considers failed attempts such as Exxon's entry into office systems and Mobil's acquisition of Montgomery Ward. Such diversions shift resources away from the point of battle where they are needed. This is one of the dangers that can be avoided by a bottom-up strategy based on what can be accomplished on the tactical level.

The Marketing General

Ries and Trout believe in having relatively few people involved in the strategic process. The organization needs a strong marketing "general" to formulate the strategy from the tactical realities. A marketing general has the following characteristics:

- Flexibility - to adjust the strategy to the situation.
- Courage - to make a decision and stand by it.
- Boldness - to act without hesitation when the time is right.
- Knowing the facts - in order to formulate strategy from the ground up.
- Knowing the rules - but internalizing them so they can be forgotten.
- Lucky - marketing warfare has an element of chance; a good strategy only makes the odds more favorable.

Summary

Ries and Trout have identified interesting and useful commonalities between military strategy and marketing strategy. As in military warfare, the appropriate marketing warfare strategy depends on the firm's position relative to its opponents. In developing its strategy, the firm must objectively determine its position in the market. Once this is done,

a defensive, offensive, flanking, or guerrilla strategy can be selected depending on the firm's position relative to the competition.

MARKET SHARE

Sales figures do not necessarily indicate how a firm is performing relative to its competitors. Rather, changes in sales simply may reflect changes in the market size or changes in economic conditions.

The firm's performance relative to competitors can be measured by the proportion of the market that the firm is able to capture. This proportion is referred to as the firm's market share and is calculated as follows:

Market Share = Firm's Sales / Total Market Sales

Sales may be determined on a value basis (sales price multiplied by volume) or on a unit basis (number of units shipped or number of customers served).

While the firm's own sales figures are readily available, total market sales are more difficult to determine. Usually, this information is available from trade associations and market research firms.

Reasons to Increase Market Share

Market share often is associated with profitability and thus many firms seek to increase their sales relative to competitors. Here are some specific reasons that a firm may seek to increase its market share:

- Economies of scale - higher volume can be instrumental in developing a cost advantage.
- Sales growth in a stagnant industry - when the industry is not growing, the firm still can grow its sales by increasing its market share.
- Reputation - market leaders have clout that they can use to their advantage.
- Increased bargaining power - a larger player has an advantage in negotiations with suppliers and channel members.

Ways to Increase Market Share

The market share of a product can be modeled as:

Share of Market = Share of Preference x Share of Voice x Share of Distribution

According to this model, there are three drivers of market share:

- Share of preference - can be increased through product, pricing, and promotional changes.

- Share of voice - the firm's proportion of total promotional expenditures in the market. Thus, share of voice can be increased by increasing advertising expenditures.
- Share of distribution - can be increased through more intensive distribution.

From these drivers we see that market share can be increased by changing the variables of the marketing mix.

- Product - the product attributes can be changed to provide more value to the customer, for example, by improving product quality.
- Price - if the price elasticity of demand is elastic (that is, > 1), a decrease in price will increase sales revenue. This tactic may not succeed if competitors are willing and able to meet any price cuts.
- Distribution - add new distribution channels or increase the intensity of distribution in each channel.
- Promotion - increasing advertising expenditures can increase market share, unless competitors respond with similar increases.

Reasons Not to Increase Market Share

An increase in market share is not always desirable. For example:

- If the firm is near its production capacity, an increase in market share might necessitate investment in additional capacity. If this capacity is underutilized, higher costs will result.
- Overall profits may decline if market share is gained by increasing promotional expenditures or by decreasing prices.
- A price war might be provoked if competitors attempt to regain their share by lowering prices.
- A small niche player may be tolerated if it captures only a small share of the market. If that share increases, a larger, more capable competitor may decide to enter the niche.
- Antitrust issues may arise if a firm dominates its market.

In some cases it may be advantageous to decrease market share. For example, if a firm is able to identify certain customers that are unprofitable, it may drop those customers and lose market share while improving profitability.

MARKETING STRATEGY

The marketing concept of building an organization around the profitable satisfaction of customer needs has helped firms to achieve success in high-growth, moderately competitive markets. However, to be successful in markets in which economic growth has leveled and in which there exist many competitors who follow the marketing concept, a well-developed marketing strategy is required. Such a strategy considers a portfolio of products and takes into account the anticipated moves of competitors in the market.

The Case of Barco

In late 1989, Barco N.V.'s projection systems division was faced with Sony's surprise introduction of a better graphics projector. Barco had been perceived as a leader, introducing high quality products first and targeting a niche market that was willing to pay a higher price. Being a smaller company, Barco could not compete on price, so it traditionally pursued a skimming strategy in the graphics projector market, where it had a 55% market share of the small market. Barco's overall market share for all types of projectors was only 4%.

Even though Barco's market was mainly in graphics projectors, the company had not introduced a new graphics projector in over two years. Instead, it was spending a large portion of its R&D budget on video projector products. However, video projectors were not Barco's market.

Barco's engineers had been working long hours on their new projector that would not be as good as Sony's. Some people thought they should not stop work on that product since the engineers' morale would suffer after being told how important it was to work hard to get the product out. However, even considering the morale of the product team, it would not have been a good idea to introduce a product that was inferior to that of Sony. Barco wisely stopped working on the inferior product and put a major effort in developing a projector that outperformed Sony's.

The Barco case illustrates several marketing strategy concepts:

- Price / Selling Effort Strategies: A firm that follows a skimming strategy seeks to be the first to introduce a product with very good performance, selling it to the innovator market segment and charging a premium price for it. It makes as much profit as possible, then moves on when the competition arrives. The price is likely to fall over time as competition is encountered. Such a skimming strategy contrasts with a penetrating strategy, which seeks to gain market share by sacrificing short-term profits, and increasing the price over time as market share is gained.
- Competitors have certain strengths and abilities. To succeed, a firm must leverage its own unique abilities.

- A firm should prepare defensive strategies before potential threats arrive. If the competition surprises a firm with the introduction of a vastly superior product, the firm should resist the temptation to proceed with its mediocre product. A firm never should introduce a product that is obsolete when it hits the market.
- The competition's probable response to a firm's actions should be considered carefully.

Marketing Research for Strategic Decision Making

The two most common uses of marketing research are for diagnostic analysis to understand the market and the firm's current performance, and opportunity analysis to define any unexploited opportunities for growth. Marketing research studies include consumer studies, distribution studies, semantic scaling, multidimensional scaling, intelligence studies, projections, and conjoint analysis. A few of these are outlined below.

- Semantic scaling: a very simple rating of how consumers perceive the physical attributes of a product, and what the ideal values of those attributes would be. Semantic scaling is not very accurate since the consumers are polled according to an ordinal ranking so mathematical averaging is not possible. For example, 8 is not necessarily twice as much as 4 in an ordinal ranking system. Furthermore, each person uses the scale differently.
- Multidimensional scaling (MDS) addresses the problems associated with semantic scaling by polling the consumer for pair-wise comparisons between products or between one product and the ideal. The assumption is that while people cannot report reliably which attributes drive their choices, they can report perceptions of similarities between brands. However, MDS analyses do not indicate the relative importance between attributes.
- Conjoint analysis infers the relative importance of attributes by presenting consumers with a set of features of two hypothetical products and asking them which product they prefer. This question is repeated over several sets of attribute values. The results allow one to predict which attributes are the more important, the combination of attribute values that is the most preferred. From this information, the expected market share of a given design can be estimated.

Multi-Product Resource Allocation

The most common resource allocation methods are:

- Percentage of sales
- Executive judgement
- All-you-can-afford
- Match competitors
- Last year based

Another method is called decision calculus. Managers are asked four questions:

What would sales be with:

1. no sales force
2. half the current effort
3. 50% greater effort
4. a saturation level of effort.

From these answers, one can determine the parameters of the S-curve response function and use linear programming techniques to determine resource allocations.

Decision algorithms that result in extreme solutions, such as allocating most of the sales force to one product while neglecting another product often do not yield practical solutions.

For mature products, sales increase very little as a function of advertising expenditures. For newer products however, there is a very positive correlation.

Portfolio models may be used to allocate resources among major product lines or business units. The BCG growth-share matrix is one such model.

New Product Diffusion Curve

As a new product diffuses into the market, some types of consumers such as innovators and early adopters buy the product before other consumers. The product adoption follows a trajectory that is shaped like a bell curve and is known as the product diffusion curve. The marketing strategy should take this adoption curve into account and address factors that influence the rate of adoption by the different types of consumers.

Dynamic Product Management Strategies

Two fundamental issues of product management are whether to pioneer or follow, and how to manage the product over its life cycle.

Order of market entry is very important. In fact, the forecasted market share relative to the pioneering brand is the pioneering brand's share divided by the square root of the order of entry. For example, the brand that entered third is forecasted to have $1/\sqrt{3}$ times the market share of the first entrant (Marketing Science, Vol. 14, No. 3, Part 2 of 2, 1995.) This rule was determined empirically.

The pioneering advantage is obtained from both the supply and demand side. From the supply side, there are raw material advantages, better experience effects to provide a cost advantage, and channel preemption. On the demand side, there is the advantage of familiarity, the chance to set a standard, and the choice of perceptual position.

Once a firm gains a pioneering advantage, it can maintain it by improving the product, creating a standard, advertise that it was the first, and introduce a new product in the market that may cannibalize the first but deter other firms from entering.

There also are disadvantages to being the pioneer. Being first allows a competitor to leapfrog the early technology. The incumbent develops inertia in its R&D and may not be a flexible as newcomers. Developing an industry has costs that the pioneer must bear alone, and the way the industry develops and its potential size are not deterministic.

There are four classic price/selling effort strategies:

INSERT DIAGRAM

In general, products are clustered in the low-low or high-high categories. If a product is in a mixed category, after introduction it will tend to move to the low-low or high-high one.

Increasing the breadth of the product line as several advantages. A firm can better serve multiple segments, it can occupy more of the distributors' shelf space, it offers customers a more complete selection, and it preempts competition. While a wider range of products will cause a firm to cannibalize some of its own sales, it is better to do so oneself rather than let the competition do so.

The drawbacks of broad product lines are reduced volume for each brand (cannibalization), greater manufacturing complexity, increased inventory, more management resources required, more advertising (or less per brand), clutter and confusion in advertising for both customers and distributors.

To increase profits from existing brands, a firm can improve its production efficiency, increase the demand through more users, more uses, and more usage. A firm also can defend its existing base through line extensions (expand on a current brand), flanker brands (new brands in an existing product area), and brand extensions.

MARKETING RESEARCH

Managers need information in order to introduce products and services that create value in the mind of the customer. But the perception of value is a subjective one, and what customers value this year may be quite different from what they value next year. As such, the attributes that create value cannot simply be deduced from common knowledge. Rather, data must be collected and analyzed. The goal of marketing research is to provide the facts and direction that managers need to make their more important marketing decisions.

To maximize the benefit of marketing research, those who use it need to understand the research process and its limitations.

Marketing Research vs. Market Research

These terms often are used interchangeably, but technically there is a difference.

Market research deals specifically with the gathering of information about a market's size and trends. Marketing research covers a wider range of activities. While it may involve market research, marketing research is a more general systematic process that can be applied to a variety of marketing problems.

The Value of Information

Information can be useful, but what determines its real value to the organization? In general, the value of information is determined by:

- The ability and willingness to act on the information.
- The accuracy of the information.
- The level of indecisiveness that would exist without the information.
- The amount of variation in the possible results.
- The level of risk aversion.
- The reaction of competitors to any decision improved by the information.
- The cost of the information in terms of time and money.

The Marketing Research Process

Once the need for marketing research has been established, most marketing research projects involve these steps:

1. Define the problem
2. Determine research design
3. Identify data types and sources
4. Design data collection forms and questionnaires
5. Determine sample plan and size

6. Collect the data
7. Analyze and interpret the data
8. Prepare the research report

Problem Definition

The decision problem faced by management must be translated into a market research problem in the form of questions that define the information that is required to make the decision and how this information can be obtained. Thus, the decision problem is translated into a research problem. For example, a decision problem may be whether to launch a new product. The corresponding research problem might be to assess whether the market would accept the new product.

The objective of the research should be defined clearly. To ensure that the true decision problem is addressed, it is useful for the researcher to outline possible scenarios of the research results and then for the decision maker to formulate plans of action under each scenario. The use of such scenarios can ensure that the purpose of the research is agreed upon before it commences.

Research Design

Marketing research can classified in one of three categories:

- Exploratory research
- Descriptive research
- Causal research

These classifications are made according to the objective of the research. In some cases the research will fall into one of these categories, but in other cases different phases of the same research project will fall into different categories.

- Exploratory research has the goal of formulating problems more precisely, clarifying concepts, gathering explanations, gaining insight, eliminating impractical ideas, and forming hypotheses. Exploratory research can be performed using a literature search, surveying certain people about their experiences, focus groups, and case studies. When surveying people, exploratory research studies would not try to acquire a representative sample, but rather, seek to interview those who are knowledgeable and who might be able to provide insight concerning the relationship among variables. Case studies can include contrasting situations or benchmarking against an organization known for its excellence. Exploratory research may develop hypotheses, but it does not seek to test them. Exploratory research is characterized by its flexibility.
- Descriptive research is more rigid than exploratory research and seeks to describe users of a product, determine the proportion of the population that uses a product, or predict future demand for a product. As opposed to exploratory research, descriptive research should define questions, people surveyed, and the method of

analysis prior to beginning data collection. In other words, the who, what, where, when, why, and how aspects of the research should be defined. Such preparation allows one the opportunity to make any required changes before the costly process of data collection has begun. There are two basic types of descriptive research: longitudinal studies and cross-sectional studies. Longitudinal studies are time series analyses that make repeated measurements of the same individuals, thus allowing one to monitor behavior such as brand-switching. However, longitudinal studies are not necessarily representative since many people may refuse to participate because of the commitment required. Cross-sectional studies sample the population to make measurements at a specific point in time. A special type of cross-sectional analysis is a cohort analysis, which tracks an aggregate of individuals who experience the same event within the same time interval over time. Cohort analyses are useful for long-term forecasting of product demand.

- Causal research seeks to find cause and effect relationships between variables. It accomplishes this goal through laboratory and field experiments.

Data Types and Sources

Secondary Data

Before going through the time and expense of collecting primary data, one should check for secondary data that previously may have been collected for other purposes but that can be used in the immediate study. Secondary data may be internal to the firm, such as sales invoices and warranty cards, or may be external to the firm such as published data or commercially available data. The government census is a valuable source of secondary data.

Secondary data has the advantage of saving time and reducing data gathering costs. The disadvantages are that the data may not fit the problem perfectly and that the accuracy may be more difficult to verify for secondary data than for primary data.

Some secondary data is republished by organizations other than the original source. Because errors can occur and important explanations may be missing in republished data, one should obtain secondary data directly from its source. One also should consider who the source is and whether the results may be biased.

There are several criteria that one should use to evaluate secondary data.

- Whether the data is useful in the research study.
- How current the data is and whether it applies to time period of interest.
- Errors and accuracy - whether the data is dependable and can be verified.
- Presence of bias in the data.
- Specifications and methodologies used, including data collection method, response rate, quality and analysis of the data, sample size and sampling technique, and questionnaire design.
- Objective of the original data collection.

- Nature of the data, including definition of variables, units of measure, categories used, and relationships examined.

Primary Data

Often, secondary data must be supplemented by primary data originated specifically for the study at hand. Some common types of primary data are:

- demographic and socioeconomic characteristics
- psychological and lifestyle characteristics
- attitudes and opinions
- awareness and knowledge - for example, brand awareness
- intentions - for example, purchase intentions. While useful, intentions are not a reliable indication of actual future behavior.
- motivation - a person's motives are more stable than his/her behavior, so motive is a better predictor of future behavior than is past behavior.
- behavior

Primary data can be obtained by communication or by observation. Communication involves questioning respondents either verbally or in writing. This method is versatile, since one needs only to ask for the information; however, the response may not be accurate. Communication usually is quicker and cheaper than observation. Observation involves the recording of actions and is performed by either a person or some mechanical or electronic device. Observation is less versatile than communication since some attributes of a person may not be readily observable, such as attitudes, awareness, knowledge, intentions, and motivation. Observation also might take longer since observers may have to wait for appropriate events to occur, though observation using scanner data might be quicker and more cost effective. Observation typically is more accurate than communication.

Personal interviews have an interviewer bias that mail-in questionnaires do not have. For example, in a personal interview the respondent's perception of the interviewer may affect the responses.

Questionnaire Design

The questionnaire is an important tool for gathering primary data. Poorly constructed questions can result in large errors and invalidate the research data, so significant effort should be put into the questionnaire design. The questionnaire should be tested thoroughly prior to conducting the survey.

Measurement Scales

Attributes can be measured on nominal, ordinal, interval, and ratio scales:

- Nominal numbers are simply identifiers, with the only permissible mathematical use being for counting. Example: social security numbers.

- Ordinal scales are used for ranking. The interval between the numbers conveys no meaning. Median and mode calculations can be performed on ordinal numbers. Example: class ranking
- Interval scales maintain an equal interval between numbers. These scales can be used for ranking and for measuring the interval between two numbers. Since the zero point is arbitrary, ratios cannot be taken between numbers on an interval scale; however, mean, median, and mode are all valid. Example: temperature scale
- Ratio scales are referenced to an absolute zero values, so ratios between numbers on the scale are meaningful. In addition to mean, median, and mode, geometric averages also are valid. Example: weight

Validity and Reliability

The validity of a test is the extent to which differences in scores reflect differences in the measured characteristic. Predictive validity is a measure of the usefulness of a measuring instrument as a predictor. Proof of predictive validity is determined by the correlation between results and actual behavior. Construct validity is the extent to which a measuring instrument measures what it intends to measure.

Reliability is the extent to which a measurement is repeatable with the same results. A measurement may be reliable and not valid. However, if a measurement is valid, then it also is reliable and if it is not reliable, then it cannot be valid. One way to show reliability is to show stability by repeating the test with the same results.

Attitude Measurement

Many of the questions in a marketing research survey are designed to measure attitudes. Attitudes are a person's general evaluation of something. Customer attitude is an important factor for the following reasons:

- Attitude helps to explain how ready one is to do something.
- Attitudes do not change much over time.
- Attitudes produce consistency in behavior.
- Attitudes can be related to preferences.

Attitudes can be measured using the following procedures:

- Self-reporting - subjects are asked directly about their attitudes. Self-reporting is the most common technique used to measure attitude.
- Observation of behavior - assuming that one's behavior is a result of one's attitudes, attitudes can be inferred by observing behavior. For example, one's attitude about an issue can be inferred by whether he/she signs a petition related to it.
- Indirect techniques - use unstructured stimuli such as word association tests.

- Performance of objective tasks - assumes that one's performance depends on attitude. For example, the subject can be asked to memorize the arguments of both sides of an issue. He/she is more likely to do a better job on the arguments that favor his/her stance.
- Physiological reactions - subject's response to a stimuli is measured using electronic or mechanical means. While the intensity can be measured, it is difficult to know if the attitude is positive or negative.
- Multiple measures - a mixture of techniques can be used to validate the findings, especially worthwhile when self-reporting is used.

There are several types of attitude rating scales:

- Equal-appearing interval scaling - a set of statements are assembled. These statements are selected according to their position on an interval scale of favorableness. Statements are chosen that has a small degree of dispersion. Respondents then are asked to indicate with which statements they agree.
- Likert method of summated ratings - a statement is made and the respondents indicate their degree of agreement or disagreement on a five point scale (Strongly Disagree, Disagree, Neither Agree Nor Disagree, Agree, Strongly Agree).
- Semantic differential scale - a scale is constructed using phrases describing attributes of the product to anchor each end. For example, the left end may state, "Hours are inconvenient" and the right end may state, "Hours are convenient". The respondent then marks one of the seven blanks between the statements to indicate his/her opinion about the attribute.
- Stapel Scale - similar to the semantic differential scale except that 1) points on the scale are identified by numbers, 2) only one statement is used and if the respondent disagrees a negative number should marked, and 3) there are 10 positions instead of seven. This scale does not require that bipolar adjectives be developed and it can be administered by telephone.
- Q-sort technique - the respondent if forced to construct a normal distribution by placing a specified number of cards in one of 11 stacks according to how desirable he/she finds the characteristics written on the cards.

Sampling Plan

The sampling frame is the pool from which the interviewees are chosen. The telephone book often is used as a sampling frame, but have some shortcomings. Telephone books exclude those households that do not have telephones and those households with unlisted numbers. Since a certain percentage of the numbers listed in a phone book are out of service, there are many people who have just moved who are not sampled. Such sampling biases can be overcome by using random digit dialing. Mall intercepts represent another sampling frame, though there are many people who do not shop at malls and those who shop more often will be over-represented unless their answers are weighted in inverse proportion to their frequency of mall shopping.

In designing the research study, one should consider the potential errors. Two sources of errors are random sampling error and non-sampling error. Sampling errors are those due to the fact that there is a non-zero confidence interval of the results because of the sample size being less than the population being studied. Non-sampling errors are those caused by faulty coding, untruthful responses, respondent fatigue, etc.

There is a tradeoff between sample size and cost. The larger the sample size, the smaller the sampling error but the higher the cost. After a certain point the smaller sampling error cannot be justified by the additional cost.

While a larger sample size may reduce sampling error, it actually may increase the total error. There are two reasons for this effect. First, a larger sample size may reduce the ability to follow up on non-responses. Second, even if there is a sufficient number of interviewers for follow-ups, a larger number of interviewers may result in a less uniform interview process.

Data Collection

In addition to the intrinsic sampling error, the actual data collection process will introduce additional errors. These errors are called non-sampling errors. Some non-sampling errors may be intentional on the part of the interviewer, who may introduce a bias by leading the respondent to provide a certain response. The interviewer also may introduce unintentional errors, for example, due to not having a clear understanding of the interview process or due to fatigue.

Respondents also may introduce errors. A respondent may introduce intentional errors by lying or simply by not responding to a question. A respondent may introduce unintentional errors by not understanding the question, guessing, not paying close attention, and being fatigued or distracted.

Such non-sampling errors can be reduced through quality control techniques.

Data Analysis - Preliminary Steps

Before analysis can be performed, raw data must be transformed into the right format. First, it must be edited so that errors can be corrected or omitted. The data must then be coded; this procedure converts the edited raw data into numbers or symbols. A codebook is created to document how the data was coded. Finally, the data is tabulated to count the number of samples falling into various categories. Simple tabulations count the occurrences of each variable independently of the other variables. Cross tabulations, also known as contingency tables or cross tabs, treats two or more variables simultaneously. However, since the variables are in a two-dimensional table, cross tabbing more than two variables is difficult to visualize since more than two dimensions would be required. Cross tabulation can be performed for nominal and ordinal variables.

Cross tabulation is the most commonly utilized data analysis method in marketing research. Many studies take the analysis no further than cross tabulation. This technique divides the sample into sub-groups to show how the dependent variable varies from one subgroup to another. A third variable can be introduced to uncover a relationship that initially was not evident.

Conjoint Analysis

The conjoint analysis is a powerful technique for determining consumer preferences for product attributes.

Hypothesis Testing

A basic fact about testing hypotheses is that a hypothesis may be rejected but that the hypothesis never can be unconditionally accepted until all possible evidence is evaluated. In the case of sampled data, the information set cannot be complete. So if a test using such data does not reject a hypothesis, the conclusion is not necessarily that the hypothesis should be accepted.

The null hypothesis in an experiment is the hypothesis that the independent variable has no effect on the dependent variable. The null hypothesis is expressed as H0. This hypothesis is assumed to be true unless proven otherwise. The alternative to the null hypothesis is the hypothesis that the independent variable does have an effect on the dependent variable. This hypothesis is known as the alternative, research, or experimental hypothesis and is expressed as H1. This alternative hypothesis states that the relationship observed between the variables cannot be explained by chance alone.

There are two types of errors in evaluating a hypotheses:

- Type I error: occurs when one rejects the null hypothesis and accepts the alternative, when in fact the null hypothesis is true.
- Type II error: occurs when one accepts the null hypothesis when in fact the null hypothesis is false.

Because their names are not very descriptive, these types of errors sometimes are confused. Some people jokingly define a Type III error to occur when one confuses Type I and Type II. To illustrate the difference, it is useful to consider a trial by jury in which the null hypothesis is that the defendant is innocent. If the jury convicts a truly innocent defendant, a Type I error has occurred. If, on the other hand, the jury declares a truly guilty defendant to be innocent, a Type II error has occurred.

Hypothesis testing involves the following steps:

- Formulate the null and alternative hypotheses.
- Choose the appropriate test.
- Choose a level of significance (alpha) - determine the rejection region.
- Gather the data and calculate the test statistic.

- Determine the probability of the observed value of the test statistic under the null hypothesis given the sampling distribution that applies to the chosen test.
- Compare the value of the test statistic to the rejection threshold.
- Based on the comparison, reject or do not reject the null hypothesis.
- Make the marketing research conclusion.

In order to analyze whether research results are statistically significant or simply by chance, a test of statistical significance can be run.

Tests of Statistical Significance

The chi-square (c2) goodness-of-fit test is used to determine whether a set of proportions have specified numerical values. It often is used to analyze bivariate cross-tabulated data. Some examples of situations that are well-suited for this test are:

- A manufacturer of packaged products test markets a new product and wants to know if sales of the new product will be in the same relative proportion of package sizes as sales of existing products.
- A company's sales revenue comes from Product A (50%), Product B (30%), and Product C (20%). The firm wants to know whether recent fluctuations in these proportions are random or whether they represent a real shift in sales.

The chi-square test is performed by defining k categories and observing the number of cases falling into each category. Knowing the expected number of cases falling in each category, one can define chi-squared as:

c2 = å (Oi - Ei)2 / Ei

where

Oi = the number of observed cases in category i,
Ei = the number of expected cases in category i,
k = the number of categories,
the summation runs from i = 1 to i = k.

Before calculating the chi-square value, one needs to determine the expected frequency for each cell. This is done by dividing the number of samples by the number of cells in the table.

To use the output of the chi-square function, one uses a chi-square table. To do so, one needs to know the number of degrees of freedom (df). For chi-square applied to cross-tabulated data, the number of degrees of freedom is equal to

(number of columns - 1) (number of rows - 1)
This is equal to the number of categories minus one. The conventional critical level of 0.05 normally is used. If the calculated output value from the function is greater than the chi-square look-up table value, the null hypothesis is rejected.

ANOVA

Another test of significance is the Analysis of Variance (ANOVA) test. The primary purpose of ANOVA is to test for differences between multiple means. Whereas the t-test can be used to compare two means, ANOVA is needed to compare three or more means. If multiple t-tests were applied, the probability of a TYPE I error (rejecting a true null hypothesis) increases as the number of comparisons increases.

One-way ANOVA examines whether multiple means differ. The test is called an F-test. ANOVA calculates the ratio of the variation between groups to the variation within groups (the F ratio). While ANOVA was designed for comparing several means, it also can be used to compare two means. Two-way ANOVA allows for a second independent variable and addresses interaction.

To run a one-way ANOVA, use the following steps:

1. Identify the independent and dependent variables.
2. Describe the variation by breaking it into three parts - the total variation, the portion that is within groups, and the portion that is between groups (or among groups for more than two groups). The total variation (SStotal) is the sum of the squares of the differences between each value and the grand mean of all the values in all the groups. The in-group variation (SSwithin) is the sum of the squares of the differences in each element's value and the group mean. The variation between group means (SSbetween) is the total variation minus the in-group variation (SStotal - SSwithin).
3. Measure the difference between each group's mean and the grand mean.
4. Perform a significance test on the differences.
5. Interpret the results.

This F-test assumes that the group variances are approximately equal and that the observations are independent. It also assumes normally distributed data; however, since this is a test on means the Central Limit Theorem holds as long as the sample size is not too small.

ANOVA is efficient for analyzing data using relatively few observations and can be used with categorical variables. Note that regression can perform a similar analysis to that of ANOVA.

Discriminant Analysis

Analysis of the difference in means between groups provides information about individual variables, it is not useful for determine their individual impacts when the variables are used in combination. Since some variables will not be independent from one another, one needs a test that can consider them simultaneously in order to take into account their interrelationship. One such test is to construct a linear combination, essentially a weighted sum of the variables. To determine which variables discriminate

between two or more naturally occurring groups, discriminant analysis is used. Discriminant analysis can determine which variables are the best predictors of group membership. It determines which groups differ with respect to the mean of a variable, and then uses that variable to predict new cases of group membership. Essentially, the discriminant function problem is a one-way ANOVA problem in that one can determine whether multiple groups are significantly different from one another with respect to the mean of a particular variable.

A discriminant analysis consists of the following steps:

1. Formulate the problem.
2. Determine the discriminant function coefficients that result in the highest ratio of between-group variation to within-group variation.
3. Test the significance of the discriminant function.
4. Interpret the results.
5. Determine the validity of the analysis.

Discriminant analysis analyzes the dependency relationship, whereas factor analysis and cluster analysis address the interdependency among variables.

Factor Analysis

Factor analysis is a very popular technique to analyze interdependence. Factor analysis studies the entire set of interrelationships without defining variables to be dependent or independent. Factor analysis combines variables to create a smaller set of factors. Mathematically, a factor is a linear combination of variables. A factor is not directly observable; it is inferred from the variables. The technique identifies underlying structure among the variables, reducing the number of variables to a more manageable set. Factor analysis groups variables according to their correlation.

The factor loading can be defined as the correlations between the factors and their underlying variables. A factor loading matrix is a key output of the factor analysis. An example matrix is shown below.

	Factor 1	Factor 2	Factor 3
Variable 1			
Variable 2			
Variable 3			
Column's Sum of Squares:			

Each cell in the matrix represents correlation between the variable and the factor associated with that cell. The square of this correlation represents the proportion of the variation in the variable explained by the factor. The sum of the squares of the factor loadings in each column is called an eigenvalue. An eigenvalue represents the amount of variance in the original variables that is associated with that factor. The communality is the amount of the variable variance explained by common factors.

A rule of thumb for deciding on the number of factors is that each included factor must explain at least as much variance as does an average variable. In other words, only factors for which the eigenvalue is greater than one are used. Other criteria for determining the number of factors include the Scree plot criteria and the percentage of variance criteria.

To facilitate interpretation, the axis can be rotated. Rotation of the axis is equivalent to forming linear combinations of the factors. A commonly used rotation strategy is the varimax rotation. Varimax attempts to force the column entries to be either close to zero or one.

Cluster Analysis

Market segmentation usually is based not on one factor but on multiple factors. Initially, each variable represents its own cluster. The challenge is to find a way to combine variables so that relatively homogenous clusters can be formed. Such clusters should be internally homogenous and externally heterogeneous. Cluster analysis is one way to accomplish this goal. Rather than being a statistical test, it is more of a collection of algorithms for grouping objects, or in the case of marketing research, grouping people. Cluster analysis is useful in the exploratory phase of research when there are no a-priori hypotheses.

Cluster analysis steps:

1. Formulate the problem, collecting data and choosing the variables to analyze.
2. Choose a distance measure. The most common is the Euclidean distance. Other possibilities include the squared Euclidean distance, city-block (Manhattan) distance, Chebychev distance, power distance, and percent disagreement.
3. Choose a clustering procedure (linkage, nodal, or factor procedures).
4. Determine the number of clusters. They should be well separated and ideally they should be distinct enough to give them descriptive names such as professionals, buffs, etc.
5. Profile the clusters.
6. Assess the validity of the clustering.

Marketing Research Report

The format of the marketing research report varies with the needs of the organization. The report often contains the following sections:

- Authorization letter for the research
- Table of Contents
- List of illustrations
- Executive summary
- Research objectives
- Methodology

- Results
- Limitations
- Conclusions and recommendations
- Appendices containing copies of the questionnaires, etc.

Concluding Thoughts

Marketing research by itself does not arrive at marketing decisions, nor does it guarantee that the organization will be successful in marketing its products. However, when conducted in a systematic, analytical, and objective manner, marketing research can reduce the uncertainty in the decision-making process and increase the probability and magnitude of success.

QUESTIONNAIRE DESIGN

The questionnaire is a structured technique for collecting primary data in a marketing survey. It is a series of written or verbal questions for which the respondent provides answers. A well-designed questionnaire motivates the respondent to provide complete and accurate information.

The survey questionnaire should not be viewed as a stand-alone tool. Along with the questionnaire there is field work, rewards for the respondents, and communication aids, all of which are important components of the questionnaire process.

Steps to Developing a Questionnaire

The following are steps to developing a questionnaire - the exact order may vary somewhat.

- Determine which information is being sought.
- Choose a question type (structure and amount of disguise) and method of administration (for example, written form, email or web form, telephone interview, verbal interview).
- Determine the general question content needed to obtain the desired information.
- Determine the form of response.
- Choose the exact question wording.
- Arrange the questions into an effective sequence.
- Specify the physical characteristics of the questionnaire (paper type, number of questions per page, etc.)
- Test the questionnaire and revise it as needed.

Required Information
To determine exactly which information is needed, it is useful to construct tables into which the data will be placed once it is collected. The tables will help to define what data is needed and what is not needed.

Question Type and Administration Method

Some question types include fixed alternative, open ended, and projective:

- Fixed-alternative questions provide multiple-choice answers. These types of questions are good when the possible replies are few and clear-cut, such as age, car ownership, etc.
- Open-ended questions allow the respondent to better express his/her answer, but are more difficult to administer and analyze. Often, open-ended questions are administered in a depth interview. This technique is most appropriate for exploratory research.

- Projective methods use a vague question or stimulus and attempt to project a person's attitudes from the response. The questionnaire could use techniques such as word associations and fill-in-the-blank sentences. Projective methods are difficult to analyze and are better suited for exploratory research than for descriptive or causal research.

There are three commonly used rating scales: graphic, itemized, and comparative.

- Graphic - simply a line on which one marks an X anywhere between the extremes with an infinite number of places where the X can be placed.
- Itemized - similar to graphic except there are a limited number of categories that can be marked.
- Comparative - the respondent compares one attribute to others. Examples include the Q-sort technique and the constant sum method, which requires one to divide a fixed number of points among the alternatives.

Questionnaires typically are administered via a personal or telephone interview or via a mail questionnaire. Newer methods include e-mail and the Web.

Question Content

Each question should have a specific purpose or should not be included in the questionnaire. The goal of the questions is to obtain the required information. This is not to say that all questions directly must ask for the desired data. In some cases questions can be used to establish rapport with the respondent, especially when sensitive information is being sought.

Sensitive questions can be posed in ways to increase response likelihood and to facilitate more honest responses. Some techniques are:

- Place the question in a series of less personal questions.
- State that the behavior or attitude is not so unusual.
- Phrase the question in terms of other people, not the respondent.
- Provide response choices that specify ranges, not exact numbers.
- Use a randomized response model giving the respondent pairs of questions with a randomly assigned one to answer. The interviewer does not know which question the person is answering, but the overall percentage of people assigned to the sensitive question is known and statistics can be calculated.

Form of Question Response

Questions can be designed for open-ended, dichotomous, or multichotomous responses.

- Open-ended responses are difficult to evaluate, but are useful early in the research process for determining the possible range of responses.
- Dichotomous questions have two possible opposing responses, for example, "Yes" and "No".
- Multichotomous questions have a range of responses as in a multiple choice test.

The questionnaire designer should consider that respondents may not be able to answer some questions accurately. Two types of error are telescoping error and recall loss.

- Telescoping error is an error resulting from the tendency of people to remember events as occurring more recently than they actually did.
- Recall loss occurs when people forget that an event even occurred. For recent events, telescoping error dominates; for events that happened in the distant past, recall loss dominates.

Question Wording

The questions should be worded so that they are unambiguous and easily understood. The wording should consider the full context of the respondent's situation. In particular, consider the who, what, when, where, why, and how dimensions of the question.

For example, the question,

"Which brand of toothpaste do you use?"

might seem clear at first. However, the respondent may consider "you" to be the family as a whole rather than he or she personally. If the respondent recently changed brands, the "when" dimension of the question may be relevant. If the respondent uses a different, more compact tube of toothpaste when traveling, the "where" aspect of the question will matter.

A better wording of the question might be,

"Which brand of toothpaste have you used personally at home during the past 6 months?
If you have used more than one brand, please list each of them."

When asking about the frequency of use, the questions should avoid ambiguous words such as "sometimes", "occasionally", or "regularly". Rather, more specific terms such as "once per day" and "2-3 times per week" should be used.

Sequence the Questions

Some neutral questions should be placed at the beginning of the questionnaire in order to establish rapport and put the respondent at ease. Effective opening questions are simple and non-threatening.

When sequencing the questions, keep in mind that their order can affect the response. One way to correct for this effect is to distribute half of the questionnaires with one order, and the other half with another order.

Physical Characteristics of the Questionnaire

Physical aspects such as the page layout, font type and size, question spacing, and type of paper should be considered. In order to eliminate the need to flip back and forth between pages, the layout should be designed so that a question at the bottom of the page does not need to be continued onto the next page. The font should be readable by respondents who have less-than-perfect visual acuity. The paper stock should be good quality to project the image that the questionnaire is important enough to warrant the respondents' time. Each questionnaire should have a unique number in order to better account for it and to know if any have been lost.

Test and Revise the Questionnaire

The questionnaire should be pre-tested in two stages before distributing. In the first stage, it should be administered using personal interviews in order to get better feedback on problems such as ambiguous questions. Then, it should be tested in the same way it will be administered. The data from the test should be analyzed the same way the administered data is to be analyzed in order to uncover any unanticipated shortcomings.

Different respondents will answer the same questionnaire differently. One hopes that the differences are due to real differences in the measured characteristics, but that often is not the case. Some sources of the differences between scores of different respondents are:

- True differences in the characteristic being measured.
- Differences in other characteristics such as response styles.
- Differences in transient personal factors such as fatigue, etc.
- Differences in situation, such as whether spouse is present.
- Differences in the administration, such as interviewer tone of voice.
- Differences resulting from sampling of items relevant toward the characteristic being measured.
- Differences resulting from lack of clarity of the question - may mean different things to different people.
- Differences caused by mechanical factors such as space to answer, inadvertent check marks, etc.

CONJOINT ANALYSIS

When asked to do so outright, many consumers are unable to accurately determine the relative importance that they place on product attributes. For example, when asked which attributes are the more important ones, the response may be that they all are important. Furthermore, individual attributes in isolation are perceived differently than in the combinations found in a product. It is difficult for a survey respondent to take a list of attributes and mentally construct the preferred combinations of them. The task is easier if the respondent is presented with combinations of attributes that can be visualized as different product offerings. However, such a survey becomes impractical when there are several attributes that result in a very large number of possible combinations.

Fortunately, conjoint analysis can facilitate the process. Conjoint analysis is a tool that allows a subset of the possible combinations of product features to be used to determine the relative importance of each feature in the purchasing decision. Conjoint analysis is based on the fact that the relative values of attributes considered jointly can better be measured than when considered in isolation.

In a conjoint analysis, the respondent may be asked to arrange a list of combinations of product attributes in decreasing order of preference. Once this ranking is obtained, a computer is used to find the utilities of different values of each attribute that would result in the respondent's order of preference. This method is efficient in the sense that the survey does not need to be conducted using every possible combination of attributes. The utilities can be determined using a subset of possible attribute combinations. From these results one can predict the desirability of the combinations that were not tested.

Steps in Developing a Conjoint Analysis

Developing a conjoint analysis involves the following steps:

1. Choose product attributes, for example, appearance, size, or price.
2. Choose the values or options for each attribute. For example, for the attribute of size, one may choose the levels of 5", 10", or 20". The higher the number of options used for each attribute, the more burden that is placed on the respondents.
3. Define products as a combination of attribute options. The set of combinations of attributes that will be used will be a subset of the possible universe of products.
4. Choose the form in which the combinations of attributes are to be presented to the respondents. Options include verbal presentation, paragraph description, and pictorial presentation.
5. Decide how responses will be aggregated. There are three choices - use individual responses, pool all responses into a single utility function, or define segments of respondents who have similar preferences.
6. Select the technique to be used to analyze the collected data. The part-worth model is one of the simpler models used to express the utilities of the various

attributes. There also are vector (linear) models and ideal-point (quadratic) models.

The data is processed by statistical software written specifically for conjoint analysis.

Conjoint analysis was first used in the early 1970's and has become an important marketing research tool. It is well-suited for defining a new product or improving an existing one.

DEALING WITH THE PRESS

When dealing with the press, it is important to realize that the outcome will not necessarily be like you think it should be. Rather than controlling the press, it is better to think in terms of managing it. The following covers some basics and serves as a primer on managing the press.

Know With Whom You Are Dealing

If you are contacted by a reporter, the reporter should identify herself and the organization that she is representing. Be sure to have a clear understanding of which media you are dealing with, i.e. a trade publication, newspaper, or television. Provide responses that the reporter will understand. For example, a Wall Street Journal reporter probably will have a better understanding of business issues than will a smaller town newspaper reporter, so be sure to tailor your responses accordingly. Also consider who will be the ultimate audience.

Building the Relationship

Your relationship with reporters is very important and is the basis of your interaction with the media. These relationships take time to develop, and this time should be viewed as a long-term investment.

If you are heading a start-up company that has not established a relationship with the local press, read the local publications and get the names of the reporters who cover your specific topic. Check out the online version of the publication and search for articles by those reporters. It would be good to discern whether the reporter is skeptical about the type of company you are running, for example, if the last start-up he covered went bankrupt. Note any articles that are particularly interesting to you and contact the appropriate reporter and offer to buy a cup of coffee so that you can introduce yourself, mentioning that you enjoyed the article that you found so interesting. Often your offer will be accepted; because journalists constantly are looking for news, they are more approachable than many people think. Don't expect an article to result; rather, the purpose of the meeting is to start building the relationship for when there may be some news.

To avoid appearing as though you only are seeking free publicity, consider "trend" stories. Reporters like trend stories and you increase your chance of coverage if your company can be used as an example to illustrate a trend. If your company is doing something in response to other news, it could make a great article. Even if your company is not the main topic, it nonetheless can be valuable to be mentioned in the story.

Declining to Comment

In some cases, you may not want any press coverage. In the interest of a good relationship, keep in mind that reporters expect you to answer their calls and do not like

to be ignored. If for some reason you do not want to be interviewed, you should be aware that refusing to talk to them may result in a report that you refused their calls.

Taking the call but providing no comments may result in a report that you "declined to comment." Think about whether declining to comment will be perceived negatively by the public in the particular situation. Keep in mind that by talking, you have the opportunity to better define the issue. If you decline to comment and somebody else comments instead, you are letting someone else define the issue. If you must decline and you have a good relationship with the reporter, you may consider informing him or her that you can't talk about it now, but suggest getting together in a few weeks and you'll tell all about it. In any case, the reporter still has the right to say that you declined to comment.

Terms of Engagement

Before talking to the reporter, be sure to have an understanding of the rules of engagement. A reporter's aim in life is to find out as much as possible, and you should think of talking to a reporter as talking directly to the public. You always should understand the context in which you are being interviewed:

- On-the-record : As long as the reporter identifies himself as a reporter, the assumption is that everything is "on the record." On-the-record means that your name and everything that you say can be reported.
- Off-the-record : In some cases, the interview or part of it may be "off-the-record." The meaning of off-the-record is less precise, and you should not assume that you have the same understanding of it that the reporter has. Sometimes, off-the-record means that your name will not be disclosed; other times, it means that you will not be quoted. It is a good idea to clarify what off-the-record means if there is any doubt. When you provide information that is not to be quoted, the reporter should put down any writing instruments and turn off any tape recorder. In addition to reducing the chance that an off-the-record comment will be published accidentally, this action serves as a signal that the reporter acknowledges the off-record status of the comment.
- Background information : "For background only" means that the information you provide is simply to educate the reporter. If such information is included in a news story, it usually will not be attributed to the source. One should clarify with the reporter to what extent the source will be revealed. For example, rather than using your name the reporter may attribute the information to "a company executive."

You may want to tape the interview if it will cover some sensitive topics. Get the consent of the reporter before doing so. If you are concerned about being misquoted, you can ask the reporter to read back any quotes before they are published. In most cases, they will do so if you ask and if they have the time. However, don't expect the reporter to show you the story before it is run; some sources would want to edit everything if they viewed it before publication. In the interest of professionalism most reporters will not show the

story beforehand. Misquotes may be a concern, but that is a risk that you take when you agree to be interviewed. You can manage the process to minimize errors and show your company in its best light, but do not attempt to control the process. Reporters like to feel independent and don't like to be pushed or manipulated.

There are times when a source says something that is published out of context. You should be very thoughtful about everything you say, realizing that it could be taken out of context. Be careful about making a joke; it might become the headline. If a mistake is made, you can ask for a timely publication of a correction, but most of the damage already would have been done. If you feel that there is a serious error, it might be a good idea to set up a meeting with the reporter and editor to discuss it.

Newspapers

Newspapers tend to be reporter-driven, decentralized organizations. The business side is quite different from the news operations, and executives of the company usually do not pretend that they are journalists. One part of the organization has little influence over the other parts. Sometimes editors will suggest a story, but most ideas come from the reporters. Therefore, your key relationships will be with the reporters who cover stories related to your topic. If a reporter thinks that something is newsworthy, he will convince the editor to let him cover it.

Contacting the Press

When contacting the press with a specific news item, be aware of the deadlines, which may arrive sooner than you anticipate. Make sure that the names of the people and their titles are up-to-date. If you contact a former reporter who now is performing some other job function, your message may be ignored.

INTERNATIONAL BUSINESS

- globalization of the markets through technology, advanced information systems and transportation has decreased global barriers to trade and made the market more competitive for products and services.
- In the absence of market imperfections, competition has been able to provide to consumers, better prices in the market. Supplies chains are more efficient and cheaper, resulting in lower costs.

BUSINESS & HEALTH CARE LAW

FOUR PARAMOUNT LEGAL ISSUES TO CONSIDER WHEN STARTING A COMPANY

From business structure to taxes, there are numerous legal issues to address when starting a company, many of which can bring a promising start-up to a grinding halt if the proper steps are not taken. The following four issues most frequently cause problems.

- Trademarks : Register your trademark. Simply reserving a domain name does not guarantee legal rights. Since interNIC does not deal with trademark disputes, federal trademarks take precedence over domain registrations. Unregistered trademarks do not hold up well; it is best to register the trademark federally. However, the PTO will not register a trademark if it is not distinctive enough. The U.S. government's trademark database can be accessed at http://www.uspto.gov

- Deals with cofounders : Document all deals with cofounders in case disputes arise at a later date.

- Employees : Consider legal issues of hiring employees. The largest area of potential liability for an entrepreneur often is employment law. Employees have many legal rights that must not be neglected.

- Contract liability : Establish limits of liability in contracts by limiting the maximum liability to that of the contract and by excluding consequential damages.

BUSINESS LEGAL STRUCTURES

Two issues frequently faced by start-ups are that of intellectual property and the legal structure of the business. There exists a number of different business structures that differ in several important aspects. Some of the more common business structures are:

- sole proprietorship
- general partnership
- limited partnership
- limited liability partnership
- corporation (including S corporations)
- professional associations
- limited liability companies
- business trusts
- professional corporations

There are six common issues that distinguish the different business forms:

- taxation
- liability
- risk and control
- continuity of existence
- transferability
- expense and formality

Taxation and risk and control are the more significant issues. In addition to these common issues, there also are issues specific to each form.

A one-person company generally has only three choices of business form: sole proprietorship, corporation, or a limited liability company. Multiple people typically have the additional options of general partnership, limited partnership, or a limited liability company.

Liability is a risk that one exposes oneself to when starting a business. Two types of risk are *tort risk* and *contract risk*. A tort is an intentional or unintentional harm to the person or property of another. Some examples of tort risk are worker injury, product liability, automobile liability, and general liability, such as when somebody falls on a wet floor. Examples of contract risk are financing risk and risk with vendors and customers. Tort risk can be protected against by using insurance. 99% of businesses can get an insurance policy against all tort risks. Excess insurance beyond standard liability limits often is not needed. For example, in medicine most people will settle claims at policy limits, because otherwise too many activists would protest if physician's personal assets could be easily taken.

Liabilities associated with contract risk can be limited in the contract itself. For example, software user agreements may have a general liability limitation equal to the price paid for the software.

Traditionally, there was a tradeoff between liability and taxation. However, S corporations and LLC's have changed that tradeoff so that a company can have limited liability and pass-through taxation.

Sole Proprietorship
As the simplest form of business legal structure, the sole proprietorship is viewed as being one and the same as its owner. The sole proprietor incurs little expense in setting up this form of business, and it is the most common structure among small businesses.

General Partnership
The general partnership is an association between two or more people in business seeking a profit. General partnerships have pass-through taxation and the owners are personally liable for the debts of the business. General partnerships can be formed with little formality, but because more than one person is involved it is wise to have a written partnership agreement stipulating the terms of the partnership.

Limited Partnership (LP)
The limited partnership comprises general partners who run the business and are exposed to personal liability, and limited partners who invest in the business and have only their invested capital at risk. Limited partnerships are especially useful for raising capital since they permit investors to participate financially in the business without incurring personal liability.

Limited Liability Partnership (LLP)
The limited liability partnership is similar to a limited partnership except that all partners in an LLP enjoy limited liability. Limited liability partnerships are common among professionals such as attorneys and accountants, who are not allowed to use corporations to limit their liability. Limited liability partnerships offer both the pass-through taxation of a partnership and the liability protection of a corporation.

Corporation
The corporation is the most common form of business entity among larger companies. Unlike sole proprietorships and partnerships, corporations are separate and distinct from their owners in the eyes of the law. As a separate entity, corporations have several distinguishing characteristics including limited liability, easy transferability of shares, and perpetual existance. Corporations also have centralized management who may be different persons from the actual owners.

Limited Liability Company (LLC)
Venture capitalists do not like the flow-through taxation associated with LLC's. However, in many cases an LLC is better than an S corporation for taxes because there are fewer hurdles and income can be allocated more flexibly.

The Uniform Commercial Code

Businesses are formed under state laws and are governed by the Uniform Commercial Code (UCC), which made business laws similar in all states. Before the UCC, businesses had to know and deal with the different laws in all of the states in which they operated. Note however, that Louisiana still is under the Code of Napoleon. Other uniform laws include the UPA, RUPA, ULPA, and RULPA.

LIFECYCLE OF A LAWSUIT

In the beginning phase of a lawsuit, there is a complaint, followed by the defendant's answer in which he or she tries to counter everything in the claim. The defendant then may file a counterclaim. Counterclaims are lawsuits within a lawsuit in which the defendant files a claim against the plaintiff. There then may be a preliminary motion, of which the outcome can be dismissal due to no legal claim based on reading the complaint, or a summary judgement in which a decision can be based on the facts of the case that are not in dispute.

The middle phase of a lawsuit is the discovery phase, in which each side attempts to determine how strong their case is. The discovery phase consists of interrogatories, depositions, and admissions. By this point, most cases are settled.

The end phase of a lawsuit is the trial, beginning with a pre-trial conference in which the parties attempt to settle in front of a judge without going to court. The trial then proceeds with the evidence and then a judgement and possibly a post-judgement. The post-judgement may be that a new trial is necessary, such as in cases of mistrial.

The defendant usually has the right to one appeal within a certain period of time. An appeal is filed with the appellate court, there are briefs, oral arguments, and then a decision.

The judgement is enforced by first obtaining an execution that freezes the defendant's assets. The defendant is served and the assets are levied. The defendant, however, may choose to file for bankruptcy protection, in which case all creditors are stopped, including court judgements.

Remedies

There are two types of remedies: legal and equitable. Legal remedies are money-based and seek to financially compensate one for the damage that has occurred. Equitable remedies require a specific performance. Examples of equitable remedies are injunctions, restitution, and reformation. In cases where damages are difficult to quantify, equitable remedies may be more appropriate.

Legal Case Study

When attempting to understand how courts interpret the law, it is worthwhile to study past cases of similar legal issues. Past legal cases provide the opportunity to understand the law by studying well-argued positions from both sides. When studying a case, the following points should be identified:

- Facts. One should identify which facts are important and which are not.
- Issue. One should isolate the specific legal issue relevant to the case.

- Court holding (ruling)
- Reasoning (why the court decided as it did).

OBTAINING LEGAL COUNSEL

Ways to Reduce Legal Costs

Once a small company having no in-house legal staff finds itself in litigation, it already has lost since the legal fees it pays may be large with respect to the company's size. In the U.S., losers do not have to pay the winner's legal fees, except in the case of frivolous suits, which are rare. Larger companies already have their own legal staff so the incremental cost of litigation for them may be small. Unfortunately, there is no pro bona program for companies that cannot afford legal defense. Small companies therefore must take actions to reduce potential legal costs. The follow steps can reduce legal costs substantially:

1. When at all possible, don't litigate - negotiate.
2. Put into contracts a clause requiring the losing party to pay the winning party's legal fees.
3. Put an arbitration clause into contracts. Note that arbitration is binding and enforceable in court whereas mediation is non-binding.
4. Purchase the broadest possible insurance policies in order to have the insurance company pay legal costs.
5. Whenever possible, specify in contracts that any litigation be in your own state. The costs of going to court are much higher away from home.

Types of Attorneys

Two types of attorneys are litigation attorneys, who resolve disputes, and transactional attorneys, who structure transactions, for example, by writing contracts.

Retaining Attorneys

A significant portion of venture funding goes for advertising and legal fees. Lawyers usually make their money through hourly fees. Contingency may be used in litigation of collection cases and personal injury cases. Under contingency, lawyers may take 1/3 to 1/2 of the award; this amount is negotiable. More recently, especially in California, some attorneys have begun to accept equity as partial payment for their services.

Billing rates range from $100 to $500 per hour and are billed in 1/10 of an hour increments. So one phone call would result in a bill for at least six minutes of time. Billing rates are determined by:

- Size of the law firm
- Years of experience of the attorney
- Degree of specialization of the attorney - more specialized attorneys have higher rates.

Usually, charges are added for copies, faxes, printing costs, etc.

There often is no fee for the initial consultation. The partner with whom one meet probably is not the one doing the work, so it might be a good idea to ask to meet the person who actually will be working on the case. Many large law firms ask for an up-front retainer of a few thousand dollars.

Legal Malpractice

Sometimes, the attorney may not perform as well as expected. In such cases, there are two possible remedies:

- Legal malpractice tort - lawyers should perform at a reasonable level as expected by the community. If the performance drops below the standard, the situation is one of malpractice, and monetary damages can be claimed.
- File a complaint with the state Bar for violation of ethical standards. This option does not allow monetary damages to be collected.

Four ethical standards:

1. Conflict of interest - an attorney should not represent a client for which the representation would damage another client. If an attorney has an equity interest in a client company, there may be a conflict of interest since the attorney is a minority shareholder but represents the majority shareholders.
2. Confidentiality - attorney-client privilege protects disclosures that clients make to their attorneys in confidence. Attorneys usually do not sign non-disclosure agreements because they see so many different ideas.
3. Communications / counsel - all communications must go through attorneys. Attorneys should not contact another attorney's client.
4. Imputed disqualification - none of the lawyers in a law firm should represent a client that any one of them should not represent. For example, the legal opponent of one of the clients represented by a lawyer in the firm should not be represented by any other lawyer in the firm.

Bold vs. Simpson - Case of Attorney Wrongdoing

In this case, Simpson is an entrepreneur and Bold is his attorney who also invested in Simpson's business. The business failed and Bold sued Simpson for negligently managing the investment. Simpson filed a counterclaim against Bold claiming legal malpractice in advising the structuring of the company and violating his fiduciary duty as a director of the company. Bold claimed that he had told Simpson that he was not qualified to advise the company in securities law issues and that Simpson should find a qualified attorney, but Simpson claimed that Bold was representing him in all legal aspects. Simpson's countersuit won, and Simpson was award $325,000 for legal malpractice, but Bold appealed. In the appeal, the court vacated the award of $325,000.

One lesson from this case is the importance of knowing the scope of the engagement. Bold had not agreed to advise on security law. An engagement letter always should be written by the attorney.

EMPLOYMENT LAW AND DUTIES TO ONE'S FORMER EMPLOYER

When starting a company, many entrepreneurs believe that the end justifies the means, and may be lax about fulfilling obligations to former employers. However, the fastest way to put a startup out of business is to sue it for violating duties to a former employer. Even if no duties were breached, such a lawsuit could result in over $100,000 in legal fees.

There are two types of duties to former employers, those that arise from tort law and those that arise from contract law.

Under agency law (tort law) there are three duties that an employee owes the employer:

1. Duty of loyalty - the obligation to act only in the interest of one's employer and not to compete with one's employer. Even if one is working on one's own project at home in the evening using one's own computer and equipment, the project may constitute a breech of loyalty if it competes in the same line of business as that of the employer.
2. Duty of obedience - the obligation to obey all reasonable orders of one's employer. An act of insubordination is a violation of this duty.
3. Duty of care - lack of performance is a violation of this duty.

Under contract law, there are confidentiality agreements and restrictive covenants.

1. Confidentiality agreements - two restrictions are non-use and non-disclosure. A thorough agreement should have both. An example of a confidentiality breach might be disclosing the identity of the former employer's customers to the new employer. There are three levels of confidentiality. The lowest level is public domain information, followed by confidential information, and finally by trade secrets, the highest of the three.
2. Restrictive covenants - four types of restrictive covenants are non-competition, non-disparagement, non-interference, and non-solicitation.

The following outlines the four types restrictive covenants:

A. Non-Competition agreements - can center on geography, customers, or knowledge. A firm cannot stop another firm from competing with it without a valid non-competition agreement. Two types of circumstances when non-compete agreements arise are transactional settings and employer-employee situations.

i. transactional settings - such as sale of a business. For example, is a physician sells his/her practice, a non-competition agreement might prevent the same physician from opening a new practice within a five mile radius. Courts will consider four factors when enforcing non-competition agreements in the sale of a business:

a) type of business
b) client base, size, and geography

c) impact if the non-competition agreement were extended
d) how long the agreement is to be enforced

ii. employer-employee situations - this is different from transactional settings in that the employer and employee are not on a level playing field.

Non-competition agreements are blatant restrictions on trade and are therefore difficult to enforce. However, courts are more willing to enforce those associated with transactional settings than those associated with employer-employee relationships. However, even if an employer knows that an agreement is overly restrictive and unenforceable, he/she may have employees sign it in order to make them think twice before trying to compete. A court will look at the following points when deciding whether to enforce a non-competition agreement:

a) that the agreement is reasonably limited in scope such as duration, geography, client base, and technology.
b) that the agreement is narrowly tailored to the interests of the employer, such as customer lists, trade secrets, goodwill, or extraordinary skills.
c) that the agreement is supported by valid consideration. The agreement must be the product of some bargain. When people do not give something up in exchange for something else, there is unlikely to be intention to enforce it. If a company requests that present employees sign a non-compete, the employer is giving nothing in exchange for it. This situation also applies to employees who show up the first day on the job and are requested to sign a non-compete. In order to make it enforceable, employers may specify in the offer letter that the employment is contingent on the signing of the non-competition agreement, in which case there is valid consideration.
d) that the agreement is not harmful to the public or the employee. For example, in an area that has a shortage of providers of an essential service, a court is much less likely to enforce a non-competition agreement related to that service.

A court may change an item in a non-competition agreement to a value that is more reasonable. For example, the court may shorten the duration of the agreement. Such changes are referred to a "blue penciling". The court must balance the interests of employers, such as protection against damage caused by competition, with the interests of the employees, such as the ability to earn a living. Some states have statutes specifying things that are not enforceable. But an injunction in one state does not necessarily prevent one from competing in another state.

B. Non-Disparagement agreement - prevents the employee from talking negatively about the employer.

C. Non-Interference agreement - prevents the employee from interfering with certain relationships:

- vendor/supplier
- referral patterns

- customers
-

D. Non-solicitation agreement

Non-solicitation agreements may prevent:

- solicitation of employees to attempt to steal them (but the employee may seek out your firm unless otherwise prevented)
- solicitation of customers

Under general tort claims, there are:

1. wrongful conversion (theft) of trade secrets - there have been cases in which even though non-competes had not been signed, companies have been able to get a TRO against employees who were going to a competing firm when it was inevitable that trade secrets would have been disclosed. Under the inevitable disclosure doctrine, an employee may be prevented from performing work in competition with a former employer if a court decides that he will inevitably disclose trade secrets belonging to the former employer.
2. tortuous interference with contractual relationships

Ten issues to consider when hiring a competitor's employees:

1. What the employee had been doing at the former employer - are there some potential activities in the new role that should be off limits?
2. The nature of the business - how crucial it is to be first to market, is the market in a particularly highly competitive phase, etc.
3. Whether the companies really are competing - even though they may be in the same industry, if there is little product overlap then the risk of transferring trade secrets is lower.
4. The degree of competition - even if there is product overlap, a move from a weak player to a strong player may not be a problem, unless the weaker player has just made some sort of a breakthrough.
5. Whether the employee had an in-depth knowledge of trade secrets or just general exposure.
6. Whether the former employer has been able to achieve something that the new employer has tried unsuccessfully to achieve.
7. Whether the former employer took adequate precautions to protect the trade secrets in question - otherwise they might not actually be trade secrets.
8. The amount of discretion that the employee will have - if he or she simply is implementing a pre-existing plan with little ability to change it, there may be little risk of doing damage.
9. Whether the employee will be working with former colleagues at the new employer - if an entire team is assembled and this team once had knowledge of trade secrets at the former employer, there is greater risk of disclosure of those secrets.

10. Whether the employee will receive a substantial increase in salary at the new employer - if so, this could be viewed as a premium for the trade secrets.

Employment Law Cases

Case: Business Intelligence Services, Inc. v. Carole Hudson

Facts

Carole Hudson was an employee of Business Intelligence Services (BIS). In August of 1983, Ms. Hudson received an employment offer from Management Technologies, Inc. (MTI), a competing firm. About one-third of MTI's employees were former employees of BIS. Business Intelligence Services (BIS) sought an injunction to prevent Ms. Hudson from working for MTI. Ms. Hudson believed that she had signed an employment contract with BIS in June 1983, but later could not produce a copy of it. During the summer of 1983, Ms. Hudson had received a promotion at BIS. On September 9, 1983, prior to Ms. Hudson's resignation from BIS, Ms. Hudson's supervisor at BIS told her that there was no employment contract on file for her and that such a contract was required. The secretary of BIS's president approached Ms. Hudson with a contract that she said she had retyped. Without reading the contract, Ms. Hudson signed it. The contract had a non-compete clause in it prohibiting Ms. Hudson from doing business with any of BIS's clients for a period 12 months after termination of her employment.

On December 29, 1983, Ms. Hudson resigned from BIS. BIS noted the non-competition clause, and Ms. Hudson expressed her view that the contract that she had signed in June had no such clause. There was no evidence that Ms. Hudson would be unable to gain employment for the 12 month non-compete duration.

Issue

The issue in this case is whether the non-competition clause was enforcable. First, it may have been misrepresented since it had been presented to Ms. Hudson as a retyped version of the original. Second, since the new contract was presented after the commencement of employment with BIS, there is a question of whether consideration was given.

Holding

The non-competition clause is enforcable, and its one-year duration is reasonable.

Reasoning

In the presentation of the employment contract on September 9, while it may have been misrepresented, there is no evidence of intention to deceive. When one signs something, one is bound by its terms so one should know what is in it. While continued employment does not constitute valid consideration, Ms. Hudson's promotion does. Furthermore, BIS's specific knowledge of clients' systems are protectible as a trade secret.

The remedy in this case was an equitable remedy since BIS would suffer irreparable harm and actual damages would be difficult to quantify. The court issued a preliminary injunction to prevent Ms. Hudson from commencing employment at MTI.

Case: Reed, Roberts Associates, Inc., v. John J. Strauman

Facts

Reed, Roberts track the employment laws in 50 states and advises companies doing business in those states. John Strauman was a vice-president of Reed, Roberts who had signed a restrictive covenant indicating that he would not solicit any of the firm's clients for three years after the termination of he employment. After 11 years with Reed, Roberts, Mr. Strauman resigned and formed a company called Curator Associates, Inc, which was located in the same city as Reed, Roberts and which was in direct competition with Reed, Roberts.

Issue

Enforceability of non-competition and non-solicitation.

Holding

The initial court ruled that the non-solicitation clause was enforceable but that the non-competition clause was not. However, the court of appeal ruled that neither was enforceable.

Reasoning

The lower court reasoned that the non-competition clause was not enforceable because it interfered with Mr. Strauman's right to earn a living, but that the non-solicitation clause was enforceable because it would be unjust for Mr. Strauman to utilize his knowledge of Reed, Roberts' internal operations to solicit its clients. The court of appeal reasoned that the solicitation of customers usually was done through a public directory such as Dun and Bradstreet's *Million Dollar Directory*, so this information did not constitute trade secrets.

Case: Structural Dynamics Research Corporation v. Engineering Mechanics Research Corporation

Facts

Structural Dynamics Research Corportation (SDRC) and Engineering Mechanics Research Corporation (EMRC) both are in the business of structural analysis and testing. Kothawala, Surana, and Hildebrand were former employees of SDRC, where they had

signed confidentiality agreements. Kothawala and Surana had developed an isoparametric computer program in their roles at SDRC. Kothawala left SDRC to establish EMRC and the other two followed him shortly thereafter. While at SDRC, Kothawala and Hildebrand had sent to Ford a letter that criticized SDRC with the intent to transfer the Ford business to their new company once they left. Furthermore, parts of EMRC's computer program code were found to be identical to those of SDRC's.

Issue

Breach of trust, breach of contractual duty not to use or disclose confidential information, and unfair competion.

Holding

The court did not enforce the non-competition clause. The former employees were found liable for SDRC's loss of profits from Ford due to Kothalwala's and Hildebrand's disparaging SDRC's ability to complete the project. Due to unauthorized use of SDRC's confidential information, EMRC was liable to SDRC in the amount of 15% of its sales for the next three years, and $45,000 in damages were to be paid to SDRC.

Reasoning

The contract was entered into in Ohio. The Michigan court declared it enforceable under Ohio law, but since it was contrary to Michigan's public policy, Michigan refused to enforce it. Surana created the confidential knowledge, so he only had to keep it confidential while employed by SDRC. The case was a close one. What tipped the scale was the breach of trust from the disparagement of SDRC before leaving the company.

HEALTH CARE LAW

Health care law is not a specific body of law. Rather it borrows from various other elements of the academic legal framework. Over the years, there have been a number of decisions that have thus built up an amount of case law from which we can seek guidance on a number of issues.

Some Landmark Cases

- Crits v. Sylvester
- Wilson v. Swanson
- McCormick v. Marcotte
- Hopp v. Lepp 1980
- Riebl v. Hughes 1980

Relevant Elements of Negligence Law

- Duty of Care
  - Treat
  - Refer
    - When unable to diagnose
    - Pt not responding to conventional treatment
    - Pt needs treatment that the doctor is not competent to give
    - Duty to guard against own inexperience
    - Cannot continue to treat the patient
  - Instruct
  - Attend – to be there
  - Diagnose – to find out what is wrong
- Breach of Standard of Care – average reasonable competent prudent person
  - Professional Standard
    - Qualifications – Crits vs. Sylvester 1956
    - Riskiness – higher risk → higher standard of care
    - Resources – people, equipment, infrastructure, location
    - Time – SOC for that date and place
    - Emergency / Elective
    - From experts on opinions and probabilities of average reasonable person with this qualification, resource, risk, time
  - Judicial Standard
    - When non-technical sort of matter
    - Relates to some safety precaution
- Injury
- Causation
  - Factual – But For (Sine Qua Non)
  - Proximate – how close or far apart are the injury and the action
    - Remoteness
    - Foreseeability
  - IN A ROBUST AND PRAGMATIC APPROACH – Justice Sopinka

Possible Defence Strategies

- Met the standard of care / Approved Practice (time, proof, respectable minority)
- Error of judgement
    - not fudge factor method which is the soc was slightly higher than what was done
    - correct use is what the defendant did and why it was the wrong choice but done for the right reasons, and met the standard of care
    - this could have been done by a reasonable person as well
- Patient the author of misfortune in whole or part
- Limitation Period has elapsed

Relevant Elements of Contract Law

- 3 cases of Assult and Battery
    - Beyond Scope of Consent
    - Fraud/Deception/misrepresentation
    - Refusal

- special cases
    - therapeutic privilege
    - waiver
    - common risks

- material risks – based on probability and gravity
- specific questions – nature and gravity of what is to be done

- Voluntary
    - not coerced
- Capacity
    - Measure of intelligence; IQ or presence of a mental disorder
- Referable
    - To the treatment or the treator
- Informed
- Elements of Negligence Law
    - Duty of Disclosure – material, specific questions
    - Breach of Standard of Disclosure
        - Professional Standard – what profession does
        - Patient Standard – what patient would want to know
        - Judicial Standard – what judge thinks people should know
    - Injury
    - Causation
        - Modified objective test – based on the case and the patient
        - Would average reasonable person say yes if this missing information was provided
        - Why not subjective test- it will always be no – they sued!!!
        - Subjected to the hindsight and bitterness of the patient

SAMPLE BUSINESS PLAN OUTLINE

Title Page

Name of company, date, contact information, etc.

Table of Contents

Executive Summary

1. Business Concept
2. Company
3. Market Potential
4. Management Team
5. Distinct Competencies
6. Required Funding and its Use
7. Exit Strategy

Main Sections

I. Company Description

- Mission Statement
- Summary of Activity to Date
- Current Stage of Development
- Competencies
- Product or Service
    - Description
    - Benefits to customer
    - Differences from current offerings
- Objectives
- Keys to Success
- Location and Facilities

II. Industry Analysis

- Entry Barriers
- Supply and Distribution
- Technological Factors
- Seasonality
- Economic Influences
- Regulatory Issues

III. Market Analysis

- Definition of Overall Market
- Market Size and Growth
- Market Trends
- Market Segments

- Targeted Segments
- Customer Characteristics
- Customer Needs
- Purchasing Decision Process
- Product Positioning

IV. Competition
- Profiles of Primary Competitors
- Competitors' Products/Services & Market Share
- Competitive Evaluation of Product
    - Distinct Competitive Advantage
    - Competitive Weaknesses
- Future Competitors

V. Marketing and Sales
- Products Offered
- Pricing
- Distribution
- Promotion
    - Advertising and Publicity
    - Trade Shows
    - Partnerships
    - Discounts and Incentives
- Sales Force
- Sales Forecasts

VI. Operations
- Product Development
    - Development Team
    - Development Costs
    - Development Risks
- Manufacturing (if applicable)
    - Production Processes
    - Production Equipment
    - Quality Assurance
    - Administration
- Key Suppliers
- Product / Service Delivery
- Customer Service and Support
- Human Resource Plan
- Facilities

VII. Management and Organization
- Management Team
- Open Positions
- Board of Directors

- Key Personnel
- Organizational Chart

VIII. Capitalization and Structure

- Legal Structure of Company
- Present Equity Positions
- Deal Structure
- Exit Strategy

IX. Development and Milestones

Time may be specified on a relative scale rather than specific calendar dates. Milestones may include some or all of the following:

- Financing Commitments
- Product Development Milestones
    - Prototype
    - Testing
    - Launch
- Signing of Significant Contracts
- Achievment of Break-even Performance
- Expansion
- Additional Funding
- Any other significant milestones

X. Risks and Contingencies

Some common risks include:

- Increased competition
- Loss of a key employee
- Suppliers' failure to meet deadlines
- Regulatory changes
- Change in business conditions

XI. Financial Projections

- Assumptions (Start date, commissions, tax rates, average inventory, sales forecasts, etc.)
- Financial Statements (Balance Sheet, Income Statement, Cash Flow Statement)
- Break Even Analysis
- Key Ratio Projections (quick ratio, current ratio, D/E, D/A, ROE, ROA, working capital)
- Financial Resources
- Financial Strategy

XII. Summary and Conclusions

Appendices

May include:

- Management Resumes

- Competitive Analysis
- Sales Projections
- Any other supporting documents

STRATEGY

MUST MERGE BUSINESS AND CLINICAL SKILLS

Despite what Ricardo's theory of comparative advantage states, you should still invest your resources into a solid understanding of your business and the industry in which it exists.

Our profession is under attack by people who have no interest in the health of our patients. Corporate America has targeted us as a strategic business area in which they see a huge potential for profit at the expense of our professional ethics and our professional goals. These individuals do not have to answer to our patients, nor do they have the responsibility to act…. Their goal is the bottom line, and this is not acceptable. We must fight back, NOW! As dentists we are trained to do what we do best, and that is not lobby, politic and speaking out. For this reason, we must train ourselves better in these areas, support our professional organizations and speak out to the public. Let them know the truth, who really cares for their best interest.

PURCHASING A PRACTICE

- know your industry
- know your competencies
- evaluating financial statements
    - what do all the numbers mean
    - is the practice growing, what are the trends for
        - revenue – IS
        - expenses/overhead – IS
        - write-off expense
        - EBITDA
        - Cash Flows
        - investment - BS
        - collections - in BS
        - valuation of goodwill - BS
- understand all policies
- definitely know the strategy
    - growth, p/m scope, competitive emphasis
-

MISSION

- raison d'etre
- broad product and market scope

EXTERNAL

- Competitive Analysis

    - Porter's Five Forces Analysis
        - Competitive Rivalry
        - Power of Suppliers
        - Power of Buyers
        - Threat of New Entrants
        - Threat of Substitutes
    - (want to turn each of the five forces in your favour)
- conclude the major factors in the industry and the KSF's
    - in the industry and those unique to you
    - want to reinforce the capabilities that give you competency in the KSF's and excel in at least one of them
- Assess overall attractiveness of industry and the company environment
    - Is this an attractive industry

Objective – to use this information to create a strategy that shelters and gives you a good position and thus market share

INTERNAL

- Value Chain Analysis – every dollar spent adds what (re-engineering the business)
    - VC elements
        - Existing
        - Desired
        - GAP analysis
- Resource and Capability

STRATEGIC PLAN

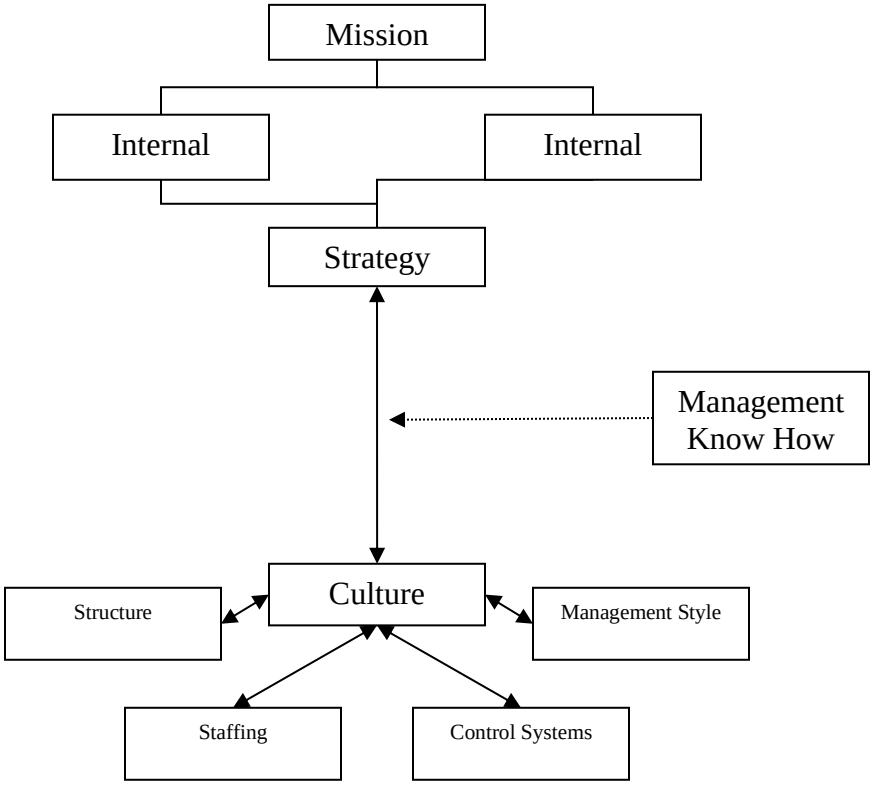
- Routes to competitive advantage – how do we compete, what business should we be in and where do we compete
- Growth Goals
    - Build, Hold, Harvest, Divest
- Product/Market Scope
    - How to grow
        - New or existing markets
        - New or existing products
- Competitive Emphasis
    - Cost leadership
        - Basic focus, efficiency focus, standardization focus, process innovation focus
    - Differentiation
        - Extras focus, effectiveness focus, customization focus, product innovation focus

CULTURE

- Structure
    - Roles responsibilities and reporting relationships

        - Standardization and formalization
        - Centralization of decision making
        - Organic vs. mechanistic
    - FORMS
        - Functional
        - Self-contained
        - Matrix
    - INFLUENCES
        - Ethnic Factors (Hoefstede) power distance, uncertainty
    - NEW FORMS
        - Infinitely Flat
        - Inverted
        - Spider Web
        - Cluster
        - Starburst
    - INTERDEPENDENCE
        - Pooled
        - Sequential
        - Reciprocal
- Management Style
    - Content Control - what
    - Process Control – how
    - Get Participative and Directive
    - Contingency Style, short term yes, but in the long term behaviour is fairly consistent
- Staffing
    - Recruitment
    - Selection
        - Qualifications – easy to verify
            - Education, experience, insider/outsider, track record, demonstrated skills
        - Qualities – not easy to verify
            - Personality, mgt style, energy, team orientation, tolerance for ambiguity, attitude (general, team)
        - What is the relative importance of Qualifications to Qualities
        - New View: Qualifications are only indicators of qualities
        - Implement processes to max qualities of individuals over qualifications
    - Development
- Control Systems

STRATEGY DIAGRAM



COMPETITIVE THREATS

Dental Industry Takes Steps to Increase Access to Care

Access to dental care continues to be the concern described in the surgeon general's "Oral Health in America" report, and dentistry has responded to the multifaceted problem in several ways, including licensure reform, oral health literacy initiatives, loan forgiveness, volunteerism, and lobbying for increased Medicaid reimbursement.

Some health care professions, legislators, and the public, however, believe more needs to be done, according to an article in a recent issue of *AGD Impact*, the newsmagazine of the Academy of General Dentistry (AGD). In response, many states have implemented alternative models of oral care delivery, which are collaborations of various health care professions, including dentists, dental auxiliaries, physicians, pediatricians, and registered nurses.

The idea behind many of the programs is akin to a "health care village" to meet the oral health needs of indigent and low-income residents. Collaborations vary in scope and partnerships, but most are statewide and commonly depend on 1 of 2 professions: physicians and dental hygienists. Many of theses collaborators say dentists are instrumental in shaping the programs. They also are one of they key factors in the success or failure of a given program. "Without dentists' support, [alternative models] just aren't going to happen," says Walt Wolford, DDS, former dental director of New Mexico.

Within dentistry, there is friction over the need for—and the safety of—alternative programs. Some dentists believe all dental care should begin and end in the dental office. Other dentists give their blessings to alternative models, but are divided over which models are acceptable. A fluoride varnish program launched in North Carolina has met with considerable success. The project's goal was to train private-practice physicians, pediatricians, and registered nurses to apply fluoride varnish to the teeth of Medicaid-dependent children from birth to age 3.

In New Mexico, the state legislature passed a bill allowing qualified dental hygienists to practice in rural and underserved areas without the supervision of a dentist. Called collaborative practice, the law allows dental hygienists to own and manage a practice while consulting with 1 or more dentists who provide treatment recommendations, prescriptions, and diagnostic services for certain procedures.

ADA policy recognizes that many state medical boards define limited preventive oral health care as being within a physician's scope of practice. The ADA, however, frowns on dental hygienist-based projects because in order to work, many of them require hygienists to provide services without the general or direct supervision of a licensed dentist.

continued on page 33

RECOMMENDED READING

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